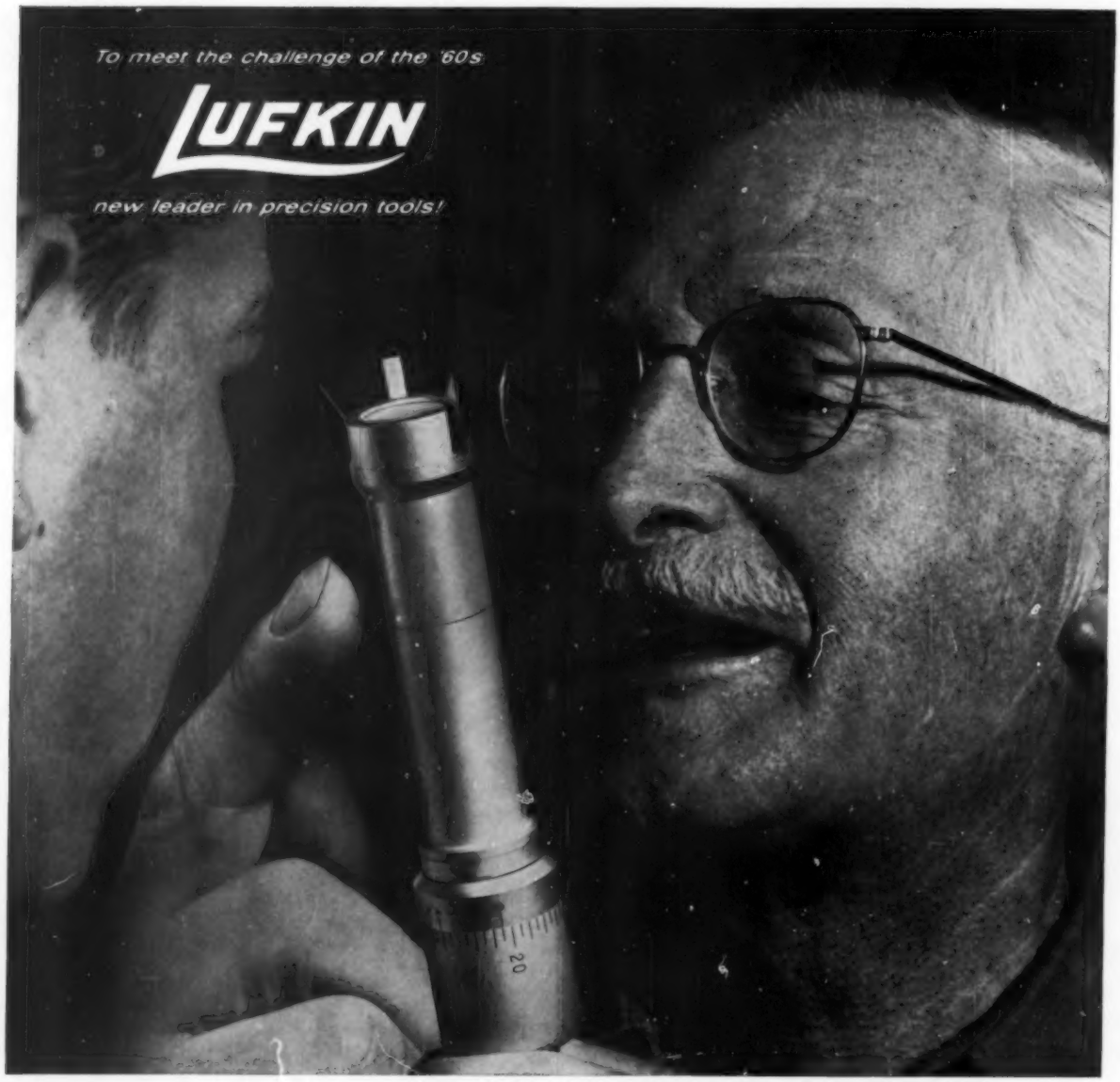
IAVE

INDUSTRIAL ARTS AND VOCATIONAL EDUCATION

Remember television when telling the industrial arts story
(see page 18)

- A Joint Convention for the AIAA and the AVA? (pg. 17)
- Guidance in Industrial Education, Bane (pg. 12)
- Special Report: Audio-Visuals in Industrial Education, Lawson (pg. 39)

February, 1961



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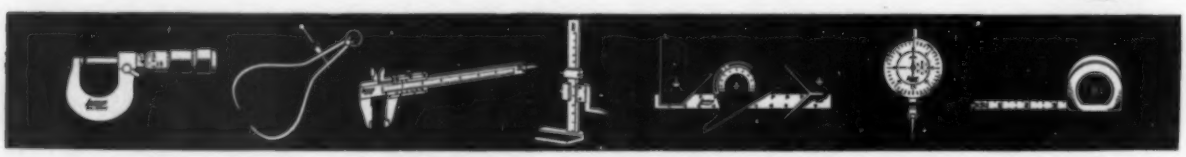

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39

your IA/VE for February

The major speeches, discussion sessions, and sidelights of **the 1960 convention of the American Vocational Association** are reported in detail (pg. 16) in your IA/VE for February as an indication of "what's new in industrial education."

Perhaps the real **"burning issue" of this year's AVA meetings in Los Angeles** was the discussion of the **possibility of a joint meeting between the AVA and the American Industrial Arts Association.** To learn the disposition of leaders of both groups toward such a combination, we've interviewed current officers. The increasing difficulty for industrial educators to attend and for companies to exhibit at two major national conventions each year certainly indicates that such a combination would be beneficial to the field.

Also, in your IA/VE this month, we have featured **a collection of practical "how-to" articles** which we believe you'll find of considerable help to you in your teaching situations. These include:

1. A special report (pg. 39) on **the role of audio-visual equipment and supplies in the efforts of the industrial educator** stressing what material is available and how to use it.

2. A discussion (pg. 22) of how **planning can achieve effective management** — what many believe is the key to shop control and, ultimately, to a successful teaching-learning situation.

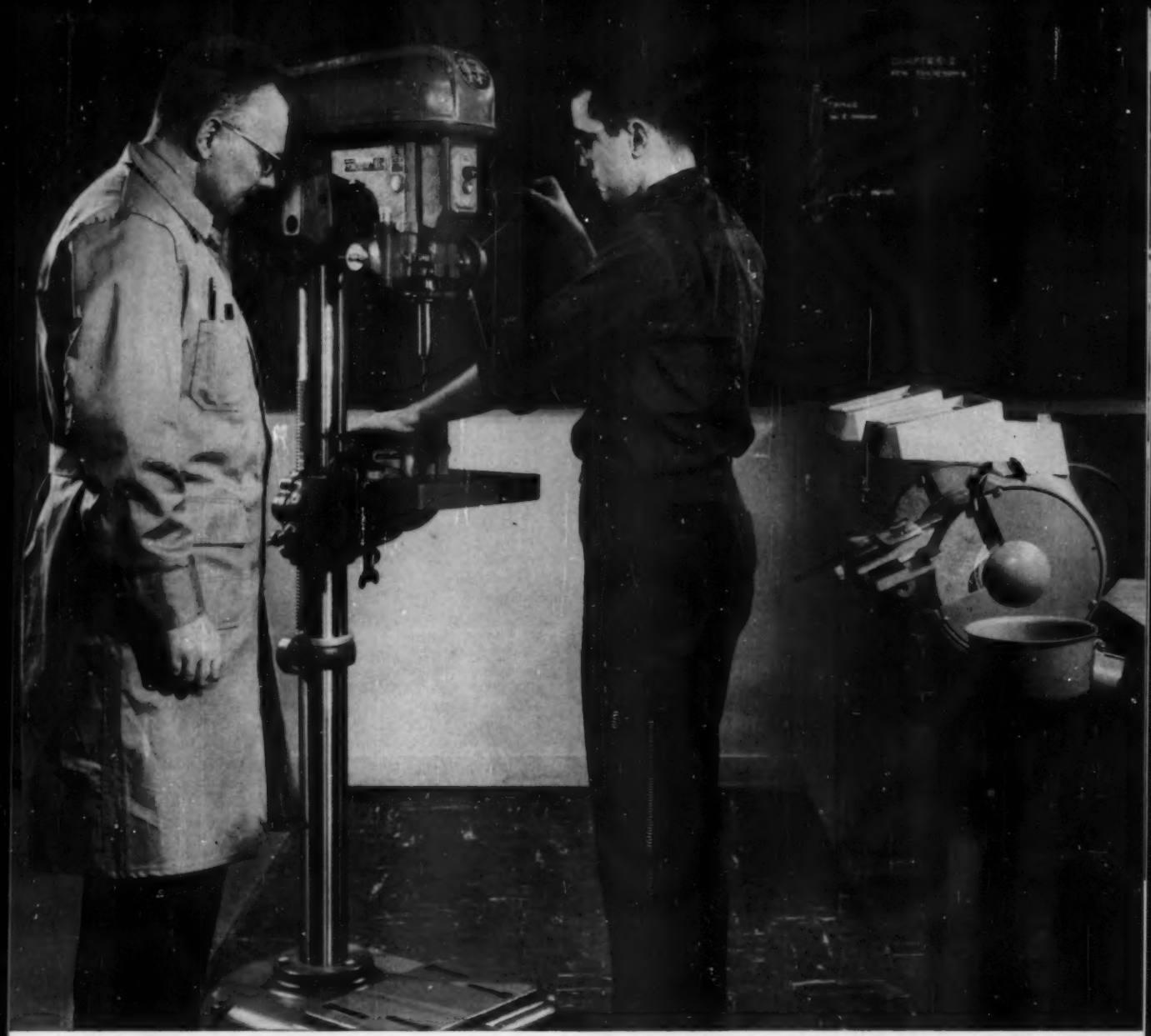
3. A pair of **brief, pointed reports on how to motivate beginning students** to learn basic work principles (pg. 24) and **how to add research activity** to the project program (pg. 25).

There are, of course, **the usual projects** (pg. 26 ff) — ten carefully selected items in wood, metal, electricity, etc. — and a number of **additional features** — on guidance (pg. 12), power mechanics (pg. 15), public relations (pg. 18), etc. — which we hope you'll have a chance to look over.

for March . . .

The March issue of your IA/VE is, annually, **our shop planning and management number,** in which a gamut of material will report on industrial education facilities: how to plan and use them efficiently, what are good examples of shops recently built, etc.

the editors



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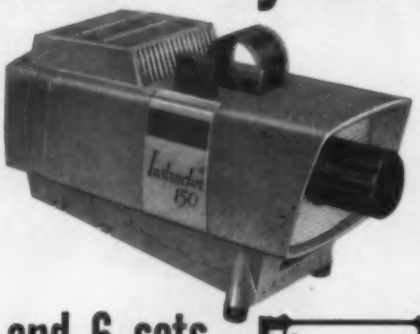

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letters

skills and related information

I have read with great interest Robert A. Henry's article entitled "Related Information" (see pg. 13 of your IA/VE for December). Though I am not from Texas, I still agree with him.

Those who believe the most important thing in industrial arts is related information more than craftsmanship, are those who could not square a board (Dark Ages) or design a project. On the other hand it may mean they are above getting their hands dirty. Tool sense cannot be learned from a lecture course or a textbook.

Most young men who have had the experience of participating in industrial arts courses without all the frosting, have not only learned, but throughout life can appreciate, good workmanship, good design, and good finish. Most parents react with pride to "projects" taken home, and a "well done" adds stature to the young craftsman.

A large part of our lack of craftsmanship can be traced back to the teacher training institutions where, again, the emphasis is on orations — on everything from "soup to nuts." If some of us "old timers," including Mr. Henry and those who agree, could visit these souped up classes, we would have little need to wonder at the lack of skills and craftsmanship so apparent these days.

F. D. Connard, industrial arts department, Webster Groves, Mo., High School

library of congress display

Your editorial on "Industrial Education and the Library" in the December issue of IA/VE (see pg. 11) has come to our attention. We recognize the need to stimulate interest among the teachers and students in library resources that are available to aid educational programs. Your statement, however, that "industrial displays can be obtained from the Library of Congress" is misleading.

The only display related to the subject that we have organized is one entitled "Industrial Architecture in 19th Century America," which the Smithsonian Institution Traveling Exhibition Service, Washington 25, D. C., is circulating. Requests for this exhibit should be addressed to Mrs. John A. Pope, head of that service.

Herbert J. Sanborn, exhibits officer, Library of Congress, Washington 25, D. C.

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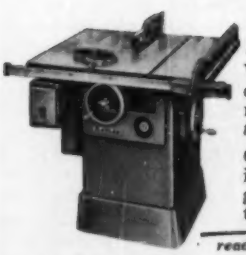

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opinion

SHOULD INDUSTRIAL ARTS ATTEMPT TO TEACH APPLIED SCIENCE AND MATHEMATICS AS PART OF THE SHOP PROGRAM?

Since Sputnik and the resulting stress on science and mathematics, many leaders in industrial education have suggested more emphasis for these technical subjects in the shop program. A reaction to this has been warnings by other industrial educators of the danger that the shop program might become only a vehicle for applying the principles taught in science and mathematics.

To obtain an idea of what people in the field (teachers, supervisors, and teacher educators selected at random from IA/VE readers) thought about the relationships of these areas, the above question was asked and the respondents voted moderately (62 per cent) "yes."

One city supervisor answered affirmatively, but explained his position by stating that "Your question implies that industrial arts teachers should claim they are teaching science and mathematics. We must stop trying to relate industrial arts *to* science and mathematics. This should be reversed, and science and mathematics should be related *to* industrial arts. There is certainly much science and mathematics applied in any good industrial arts program. It is, however, the science and mathematics of industrial arts. Cam and gear drafting involves much physics and mathematics. Stains, finishes, and glue penetrate wood for scientific reasons. We could go on and on with examples of this in industrial arts, but this is industrial arts and is not to be labeled applied mathematics and applied science. We use all learned knowledge in industrial arts — English, some foreign words, chemistry, logic. Should we claim to teach the application of all these subjects. No mathematics teacher and no science teacher tries to justify the teaching of their subjects because they teach industrial arts by offering problems in the etching action of acid or by giving problems in figuring board feet. We cannot justify the teaching of industrial arts because of the uses our students will make in life with the knowledge and skills they learn in industrial arts. Let's let it rest with this."

Should Industrial Arts Attempt to Teach Applied Science and Mathematics as Part of the Shop Program?

Yes	62%	No	38%

One teacher who answered "yes" believed that "Industrial arts cannot be taught without the use of applied science and mathematics. Completing a bill of material is only one of many ways in which we use mathematics. Practically all of our manipulative work requires the application of scientific principles." Another: "As far as possible as science and mathematics are related to industry — which is one of the objectives of industrial arts." And: "Applied science is questionable, except very incidentally. Teaching mathematics informally is required since so many of our students have little . . . knowledge of even the fundamentals. If we are going to use fractions, decimals, formulas, etc., we have to re-teach them."

Of the respondents who answered negatively, one teacher educator stated that "Several scientific principles and considerable mathematics creep into any shop program. When these occasions arise they should be brought to the attention of the student. Naturally these situations bolster the scientific principles and the use of math. It should not be necessary to take a fixed time from the shop period and devote it to science and mathematics, as such!"

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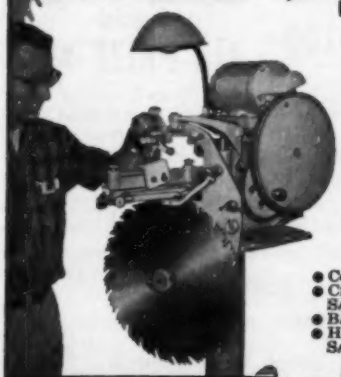

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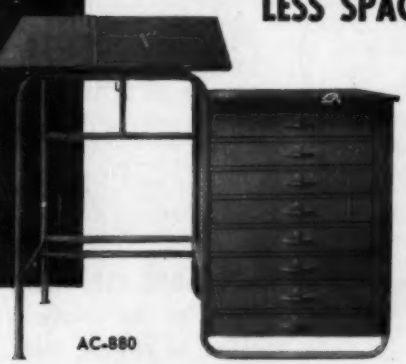

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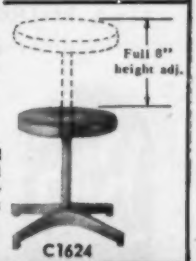

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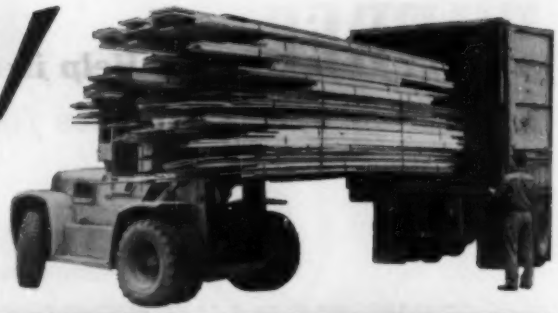

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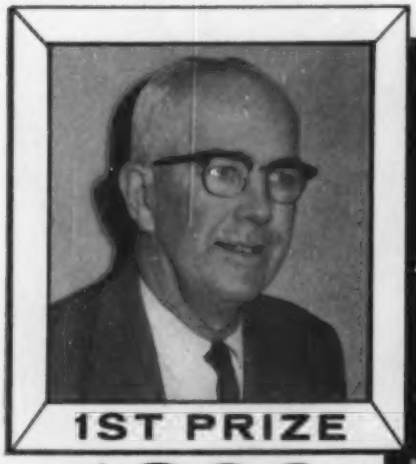

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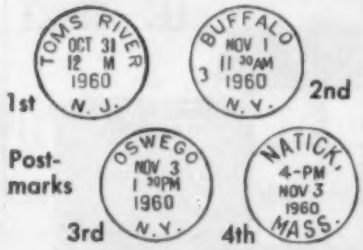
College, Fitchburg, Mass. 1949



ANOTHER SET OF HAPPY WINNERS in another of B-G's popular contests! In addition to the above, we are also awarding a special 4th place to Arthur G. Sticklor, of Natick, Mass., who came in a photo-finish fourth, postmarked just 2½ hours later on the same day as the winner of the 3rd Prize.

ENTRIES CAME FROM PRACTICALLY EVERY STATE of the Union with enough different estimates to amaze even the most rabid guesser . . . the actual number of board feet was 4798 and the four who received prizes all estimated 4800 board feet, so places were determined by postmark.

BETTER LUCK NEXT TIME! Checks have been mailed to the winners, thank-you letters and souvenirs to all entries.

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the editor's stand

CONTENT OR METHOD?

The controversy as to which is more important in education — content or method — has raged since the days of Socrates. Extremists on either side are heard to raise cries of despair and consternation when they see the opposite side gaining the upper hand. For quite a few years after World War II, it seemed that the "educationalists" — those who believe that "how" to teach is all important — were winning the battle. State certification codes began to demand more courses in education, at the same time decreasing the number of credits required in subject-matter content. However, since Sputnik the pendulum has begun to swing in the other direction and now the content specialists — those who emphasize the importance of "what" to teach — seem to be in power. This continual seesaw raises a question as to whether content *or* method should be allowed to dominate in education, or whether some central position is the best answer.

Let's look for a moment at what the extremists have to say. First, there are those who believe that content is all-important in teaching. These are the people who say that if you know *what* to teach and have a love of the subject, learning *how* to teach will follow naturally. These same people declare that they are not interested in teaching Johnnie, but, rather, that they are interested in teaching English, mathematics, or science *to* Johnnie. The most articulate critics of our high school program, including certain learned scientists, are content enthusiasts. Most of these critics are sincere enough in their beliefs never to have taken a single course in education. Surprisingly enough, a great many of our college teachers have never had a course in education! In spite of the fact that they are "teaching" teachers, they themselves have never had organized instruction in methodology. The assumption is that a professor who has a deep knowledge of his field will more or less automatically know how to teach the content. This, of course, is simply not true.

This same point of view prevailed during World War II training days. In many states, skilled craftsmen were hired as teachers without any training or experience in teaching methods. Your editor had the opportunity of first-hand observation of these "teachers in action" during his teaching in the war-training program. One rather dramatic incident is recalled. One of the machine shop instructors had his own unique approach to teaching. To begin, he always waited for the student to ask for assistance. One day, a new student who was having difficulty doing rough turning on a metal lathe appealed for help. The instructor, without a word, walked over to the lathe, turned off the power and removed the cutting tool. He took it to the grinder and gave the cutting edge a couple of quick touches. Walking back to the lathe, he put the tool in the holder, adjusted it a bit with a few flicks of the hand, tightened it, turned on the machine, and made a good rough cut. His only comment to the student as he walked away was "there!" During all of this the student looked on in awe and amazement as this magician displayed his skill at sleight of hand. Was this teaching? No! The instructor knew the content but he didn't know how to put it across to someone else.

There are extremists on the opposite side also — those who believe that method is all-important. These are the people who say that if you know *how* to teach and if you have a love of students, you'll learn *what* to teach. These are the advocates of extensive courses in education. Some who take this position are people in industrial education. We believe that this extreme position is taken by those who lack skill or knowledge in content areas, or by those who have had no opportunity to obtain those skills or content during teacher-education days, or by those who have been sold on the faulty educational philosophy which states that a child-centered school does not require teachers with a firm foundation in content. These, also, are the teachers in industrial education who excuse shoddy workmanship and poor craftsmanship with the remark, "After all, I'm not trying to teach skills, it's what happens to the boy that counts."

The real answer lies in some middle ground between content and method, *for both are important*. In industrial education, a teacher must know not only how to perform the skills and how to present the information, but he also must have a thorough grasp of methodology before he can teach someone else. We hasten to add that no beginning teacher can expect to be a specialist in all of the areas including drawing, wood, metal, electricity, power mechanics, and others. However, he should possess certain basic knowledge in each of these areas and he should also have depth in one or more of the areas. This is the reason we have proposed that every industrial arts teacher have a minimum of at least 40 semester hours of technical credit as requirement for graduation. In addition, he should have basic courses in education including work in educational psychology, course construction, teaching methods, shop organization and management, and student teaching. At the graduate level there ought to be an opportunity for the teacher to strengthen both his technical abilities and his professional competencies.

Our teachers in industrial education must know *both content and method*. We believe that a person cannot succeed as a teacher *with only one*.

John L. Feirer

Guidance in Industrial Education

JAMES E. BANE

In order to explain what guidance is, it may be well to make a few remarks about *what guidance isn't.*

Recently, two high school principals were discussing their guidance programs and their plans for making assignments for their counselors. One, a principal of a junior high school which enrolled about 1000 students, stated that his counselor was "not handicapped by having had any of those guidance courses." He was going to have his counselor (1) handle all disciplinary cases; (2) rent lockers; (3) collect, account for, and bank all book fees paid by students; (4) hear all complaints from parents, other teachers, and the public; (5) take care of all juvenile court cases involving pupils from that school; and (6) work with the welfare cases. He finished by saying, "That will take quite a load off my shoulders."

It is apparent that this was not guidance, and this so-called "counselor" did not deserve that title. We would object to the use of the name "counselor" in a school situation where the person so titled is just an office boy. We would also object to the negative emphasis. It is a futile, clean-up program. The program begins with discipline and ends with welfare — guidance hardly functions anywhere. Also a guidance program such as this will prevent the school from developing a real program — a well-rounded guidance program which will make instruction, and other purposes of the school, really effective.

Mr. Bane is administrative dean, Southwest Missouri State College Springfield, Mo.

It seems that the greatest danger to guidance in the school is not that an outright quack program will be presented — and such programs have existed in a few schools in the past. Rather, the danger is that the program will be just a little short of effective — a near miss. One high school had a slip-of-paper control system to regulate the movements of the pupils throughout the day. It was not too difficult to convince the principal that this was not a guidance program. However, during the next year, a rather good testing program was added; and the principal insisted that he now had a guidance program. When he was asked about provisions for occupational information, he put one book on occupations in the school library — for 500 pupils to read.

A few years ago, one of our state educational bulletins featured a cartoon, "Directing ain't guidance. Nor is pulling. Pushing ain't either. How about combined efforts with the guided one in charge?" We could continue this by saying "advising isn't guidance either." One eminent psychologist, in reviewing a book by a psychologist from a rival school of thought, praised it faintly by saying that "it gives the student some good advice." Even the "good advice" which some of our youngsters read daily in the newspapers is not guidance.

What, then is guidance? There is always a possibility of giving a pat definition as a beginning. But a definition is often misleading. A brief definition of intelligence, personality, or normal behavior can be confusing. The same may be true with any of the terms which we use in our daily work.

George Myers tells us that vocational guidance may take place when there are "differences among individuals and differences among occupations, . . . and the necessity arises for choice on the part of the individual. . . ."[1] Myers also insisted that the counselor, or guidance worker, needed to be especially trained.

More recently, Glen Smith[2] has called attention to the need for guidance workers and vocational-industrial teachers to get together on the matter of vocational information.

Carl Horn once defined guidance as "the process of assisting the individual in determining, analyzing, and understanding his interests, aptitudes, abilities, limitation, opportunities, problems, and needs, and in light of this knowledge, to make wise choices and adjustments in order that he may better serve society and live more happily."[3]

In schools today, guidance is the other side of the coin of education. We have a curriculum on paper, and an instructional program which grows out of this paper program. We need guidance to help make the work personal and meaningful to every individual pupil. There is just as much need for trained workers in guidance

[1] Myers, George E., *Principles and Techniques of Vocational Guidance* (New York: McGraw-Hill Book Company, 1941), p. 10.

[2] Smith, Glenn E., "The Counselor and Vocational-Industrial Education," *Industrial Arts and Vocational Education*, October, 1959, pp. 225–226.

[3] Erickson, Clifford E., and Marion C. Happ, *GUIDANCE Practices at Work* (New York: McGraw-Hill Book Company, 1946), p. 4.

- **Guidance, which makes the curriculum "personal and meaningful to every individual pupil," has a most vital role in effective industrial education.**
- **Here is a very clear, detailed review of (1) the definition, phases, and services of the guidance program and (2) the relationship of guidance to industrial education.**

as there is need for trained teachers in any school subject. Guidance and curriculum are moving in the same general direction.

Any adequate program of guidance services must be adjusted to local, state, and current needs. A guidance program functioning in one school cannot be lifted out of context and placed in another school. The guidance program of five years ago is not adequate today. State and national laws change guidance. Just as industrial educators must struggle constantly to keep up with the times, so must the guidance worker struggle to keep his practices and procedures current.

New Guidance Emphasis

For many years, school guidance programs were strongly vocational. With the rapid growth of schools, and of guidance programs, more and more counselors turned to educational, rather than to vocational, emphasis in their guidance. It has been necessary to give a new emphasis to the vocational aspects of guidance in the training and re-training of counselors. We may be familiar with the co-operative programs worked out by various universities and various stores and industrial plants. Counselors are given graduate credit for actual work programs in various stores and plants.

The difference in the sizes of schools will, in large measure, determine whether the guidance program is to be headed by a trained counselor, or by a teacher who has an hour or two released from teaching for counseling purposes. But no school is too small for some guidance. And every teacher needs to be, to some extent, a guidance worker.

The circumstances of the times also affect guidance. During the years of the Korean War, many counselors devoted much time and special skills to the problem of holding young men in school or college. Often, they stated, they were hampered by the too-enthusiastic recruiting officers. Of course, the military services soon saw the value of the guidance-directed educational effort and joined in with their own "stay-in-school" programs. Today, counselors are urged to "guide the smart boys and girls into math-science programs." We will not comment upon this use of guidance.

Froehlich[4] has stated that the guidance programs must provide: (*a*) services to pupils in groups; (*b*) services to pupils as individuals; (*c*) services to the instructional staff; (*d*) services to administration; and (*e*) research services. This set of categories is excellent for the trained guidance worker. It may not, however, be concrete enough to meet the needs of the beginner or of the teacher who co-operates with the guidance program.

On Counseling

Any guidance program must provide for *counseling*. Although some insist that there is, or can be, group counseling, counseling should be individual. It is best done in privacy, with a well-trained counselor counseling a student who feels the need for this assistance. Let us not get bogged down in the issue of whether or not counseling should be directive, nondirective, client-centered, eclectic, or something else. Let us not haggle about how many clients, or potential clients, may be assigned to one counselor during any given year. Some say 75, others suggest 100–150, or even more. We are all probably familiar with Dr. Conant's recent suggestion that there should be one full-time counselor for every 250–300 pupils. This may not be as small a ratio of pupils per counselor as we would like to see, but it is probably far ahead of actual practices.

Individual Inventory

Another specific service of the guidance program is that of the *individual inventory*, or cumulative records. It would be necessary to have a folder for each pupil. The folder should be filled with basic data which can be used by every teacher and every counselor. "Counseling without data is quackery," according to a popular saying. The teacher not only uses this information, but contributes additional information. Testing is an integral part of the inventory service. Testing may be abused through neglect, overemphasis, misuse. A trained counselor needs to be in charge of the testing program. Every teacher needs to understand standardized tests and to be able to help with the testing program. Of course, tests are not the only sources of information about pupils. We need autobiographies, anecdotal reports, and maybe socio-grams, as well as a large amount of other data about every pupil.

Placement within the school, and outside the school, linked with *follow-up* of those placed, are additional guidance services.

We would like to include in the guidance picture *community surveys*, *in-service preparation* of staff, and *research*. All of these call for highly trained personnel. They are better

[4]Froehlich, Clifford P., *Guidance Services in Schools* (New York: McGraw-Hill Book Company, 1958), pp. 13 ff.

"In industry's rapid change today, the guidance worker would be lost without the trained industrial educators..."

left alone rather than bungled by untrained individuals. *Orientation* as a service grows in importance as schools, and guidance programs, grow. We might add *referral and resource* services, which help spread the work, meaningfully and purposefully, throughout the school and the community. Nearly every school, and every community, has some persons who can provide additional, specialized services to pupils.

Role of Administration

In the long run, the school administration determines whether or not an adequate guidance program is to exist. One teacher cannot initiate and carry through a program alone. Let us illustrate: A few years ago, a young lady with considerable course work in guidance was appointed girl's physical education teacher in a small high school. She had built a file of information material as one of her college class projects. She talked with girls about occupations, and they seemed to profit from her assistance. She did as much counseling as time and facilities would permit. At the end of the school year, she was informed that she could have her job another year if she would forget about that occupational stuff! Thus ended the guidance program in that school.

The school administration picks the counselor, assigns the time for counseling, provides space and materials and the climate for counseling and the other guidance services. This is true of course of study, the athletic program, and any other program which may help make up the educational services of the school.

Emergency Guidance Aspect

The *emergency* aspects of guidance must not be overlooked. Nationally, and to an extent locally, an advance in guidance has ridden on the back of some sort of emergency. In a way this is not good. Guidance is no panacea for all the ills of our times. Guidance can help make the total educational program more effective, but it is no cure-all. In the days when guidance was beginning, it was often presented as a way to overcome some immediate difficulty. World War I helped boost guidance through the counseling programs for veterans. During the deep depression of the 1930's, guidance was aimed toward helping overcome unemployment. The National Occupational Conference of February, 1933, is an example of this aspect of the development of guidance. For years, we talked of matching youth and jobs. There was, also, some attention to re-building the confidence and competency of individuals, and of preventing square pegs from getting into round holes.

After World War II, we had an emphasis upon the prevention of drop-outs and upon the combat of juvenile delinquency. There was a nation-wide attempt to improve guidance programs through such measures as the George-Barden Act, which provided federal aid for establishing state directors of guidance, pilot programs, counselor trainers, and research in guidance. The National Defense Education Act is currently stimulating guidance in many ways. But we remain short of counselors, and some claim the immediate need for 15,000 trained counselors is equal to any other national emergency.

What are the desirable outcomes of guidance? The definition given earlier implies the outcomes. Generally, guidance is to help the pupil learn to guide himself. It is often pointed out that guidance helps reduce the school drop-out rate. Then, someone usually states that some pupils should drop out of school. This is probably a matter for individual choice. However, we do have some chance to help the individual as long as we have him in school. When he is out of school, he is usually beyond our reach and beyond any help from us. If guidance can help many individual pupils to think more meaningfully about their life work, their plans to train for it, to enter it with confidence and hope, if it can stimulate worth-while career thinking, then it has succeeded.

Relating I-E to Guidance

Both effective guidance and effective industrial education call for well-trained teachers. Just as the teacher looks for opportunities to help each individual learn the skills which are taught, so must the guidance worker look for opportunities to help each individual see his opportunities for self improvement as a service to himself and society.

We have to make education meaningful to the individual. We cannot broadcast it and expect it to just catch. To put all pupils into a vocational program would create a serious imbalance, tempt criticism — some of it from our friends, and alienate many of our future citizens from our program. It would promote costly failures. Guidance can help industrial arts determine the needs, the aptitudes, the interest of individual pupils, and can help measure their progress. Through industrial arts, guidance can learn of individual skills and abilities of many sorts.

Marshall L. Byrn, who for many years conducted a general shop in the University of Michigan High School, studied the skills and developed the skills of many boys. He convinced engineers that the general shop could provide skills which would help a boy to become a better engineering school student and a more successful professional engineer. He showed his dentist friends that future dentists could profit by a shop program. He never overlooked the fact that success comes through training, growth, and the satisfaction of accomplishment. Byrn also insisted that the industrial arts program should never become a dumping ground for those pupils who could not succeed elsewhere. He insisted that there could be excellence in industrial education as well as in liberal education. He insisted that every department should help meet the needs of boys of many levels of ability.

The old concept of *vocational psychology*, fairly popular a generation or more ago, has given way to industrial psychology and occupational psychology. Industrial education provides many unique opportunities to study the individual, to develop the individual, to provide for effective individual adjustment in a truly meaningful way. (Concluded on page 44)

▶ The fourth in a series of five articles on our **important new instructional area** (look for next month's concluding installment on planning the shop layout) —

Tools and Equipment For Power Mechanics

CHARLES G. RISHER

The initial article of this power mechanics series contained the statement "... a mechanical power area ... must be adaptable to the tools (and) equipment ... available (and suited) to an industrial arts laboratory." For instruction in power mechanics, it would be a simple matter to throw considerations of cost and required storage space to the winds, and enumerate a list of tools and equipment that would be ideal to have available. Unfortunately, the cold realities of limited budgets and storage space make the result of such an approach of little or no value to the teacher interested in developing a new approach to technological orientation through power mechanics — but none the less limited in budget and space.

By taking a practical and more realistic consideration of finances and space availability, it is our contention that a power mechanics area, basing its content in that suggested recently (see pp. 46–47 of your IA/VE for November), is capable of implementation with the selection of tools and equipment listed in this presentation. As this tool and equipment list is considered, it will be noted a large number of the items (or their completely acceptable counterparts) will be found already present in the storage facilities of most comprehensive general industrial arts laboratories. This approach to the tools and equipment has been held desirable from the cost consideration, and also to utilize tools of a capacity satisfactory for power mechanics instruction and not some other heavier maintenance function, hence the socket wrenches and torque wrench with a ¼ in. drive rather than ⅜ or ½ in.

The following list of tools and equipment is felt to be sufficiently comprehensive for initiating instruction in power mechanics. As this area of instruction develops and broadens in scope, additional tools and equipment should be added, in keeping with this instruction.

Tools and Equipment

1 set phillips screw drivers — composition handles — points 1 through 3
2 sets flat blade screw drivers — plastic handles — 4", 6", and 8" lengths
3 ball-peen hammers — 6 oz.
3 soft face hammers — 4 oz.
1 set cold chisels — ¼" through ⅝" blades by 8ths
2 center punches — ⅜" body diameter
1 set hand punches — ⅛" through ⅜" diameter
1 set pin punches — ⅛" through ⅜" diameter
4 brass drifts — ¾" diameter x 4"
1 set straight shank twist drills — 1/16" through ½" by 32nds
2 hand drills — ¼" capacity
1 set taps and dies — 4–36 through ¼–20
1 set screw extractors — numbers 1 through 5
3 pairs combination slip-joint pliers — 6" length
1 pair long chain needle nose pliers — 6" length
1 pair side cutting wire cutters — 6" length
1 set combination open and box end wrenches — ¼" through 1" by 16ths
1 set thin wall socket wrenches — ¼" square drive — ⅜" through 1" by 16ths
1 torque wrench — ¼" square drive — 150 foot pounds capacity
1 adjustable wrench — 10" length
1 set nut drivers — ¼" through ½"
2 feeler gauges — 3" flat blade — .001" to .030"
2 spark plug gap tool and gauges — .018" to .040" round gauge wires
1 tubing cutter — ⅜" capacity
1 flaring tool — ⅜" capacity
1 set outside micrometer calipers — 0" to 1", 1" to 2" and 2" to 3"
2 depth rule gauges — 0" to 3"
2 oil measures with flexible necks — 1 quart capacity
1 set Allen wrenches
1 set ignition or magneto point files
2 spark plug wrenches
1 valve spring compressor and retainer
1 piston ring expander
1 piston ring compressor
1 flywheel puller
1 flywheel holder — wrench type
1 flywheel holder — strap type
1 pair flexible fuel line clamp pliers
1 pair wrist pin lock spring pliers
1 soldering gun
1 heavy duty soldering iron
1 propane torch kit
1 storage battery hydrometer with temperature correction scale
1 storage battery cell voltage tester — 6 and 12 volts
1 ignition coil tester
1 ignition capacitor tester
1 tachometer or high speed indicator
1 compression pressure gauge — 0 to 100 psi.
1 vacuum gauge — 0 to 30 inches mercury
2 wire brushes with handles
2 putty knives with flexible blades
3 bench oilers
2 automatic oily waste cans
2 outboard motor jacks
1 fire extinguisher — CO_2 or foam type
2 safety cans — 1 gallon size for gasoline and lubricating oil
1 safety can — 5 gallon size for cleaning solvent
1 covered cleaning solvent tank with drain rack

As areas of power mechanics other than small gasoline engine dis-assembly and assembly are presented, instructional materials other than those usually classified as tools and equipment are necessary.

The following list of demonstration apparatus has a vital place in power mechanics instruction by providing points of departure for the more able students to investigate, report, experiment, and calculate beyond the power mechanics instructional requirements of the remainder of a class.

Demonstration Apparatus

1 water motor
1 hydraulic lift model
1 prony brake apparatus
1 brake horsepower apparatus
1 venturi tube apparatus
1 pneumatic reaction wheel
1 hero's engine model
1 fire syringe
1 electromagnetic induction apparatus
1 four stroke cycle engine model
1 two stroke cycle engine model
1 diesel engine model ◀

Dr. Risher is an assistant professor of industrial education at Western Michigan University, Kalamazoo.

associations

What Happened at the 1960 AVA?

Crisp, clear, smog-free air greeted the conventioneers to the 54th annual meeting of the AVA. For the visitor from the snow country, the weather was a pleasure with a low of 40 and a high of around 70. Every day was bright and sunny without a trace of the famous Los Angeles smog. Convention headquarters was in the Biltmore Hotel downtown. Being downtown in one of the world's largest cities did not hamper the convention members who showed great interest in the meetings and in the visits around the city. To many, the convention offered a first venture on the freeways and a sight of the thousands of cars speeding along at 65 miles an hour. For many, the convention offered an opportunity to visit Disneyland, Knott's Berry Farm, Farmers Market, and other of the area's fascinations. To all, the convention gave a wonderful chance for professional stimulation through the excellent meetings, visits to schools and colleges in this great metropolis, and valuable personal contacts with other AVA members.

By actual count, there are 412 elementary schools, 65 junior high schools, 48 senior high schools, seven junior colleges, and 27 colleges, universities, and other adult schools in Los Angeles. This is the second largest and the fastest-growing school district in the United States. To give some idea of the size of the district, your reporter drove with a supervisor from his downtown office to a high school exactly 28 miles northwest of the center of the city. A drive could have been made 26 miles from the center of the city in the other direction to visit another of the Los Angeles high schools!

The Organizations' Programs

The annual AVA meeting is actually a combination of conventions representing several divisions and organizations affiliated with the American Vocational Association. To report specifically on the hundred odd meetings in all of the areas of industrial arts, trade and industrial education, etc., would be highly impractical. However, we have chosen at random one or two meetings of each day in an effort to illustrate the general business of the convention.

1. Sunday

Beginning on Sunday, December 4, the American Technical Education Association held a series of meetings concerning the problems of technical education, particularly dealing with those programs that operate under Title VIII.

2. Monday

The first convention programs in the area of industrial arts and technical and industrial education took place on Monday, December 5. That morning there were meetings on public relations or telling the story of industrial arts, on publication writing, and an organizational meeting of the state and local industrial-arts supervisors.

Samuel L. Fick, chief of the bureau of industrial education of the California State Department of Education is shown receiving the Ship's Citation from Willian F. Nameny, chairman of the Citation Committee at the 54th AVA convention.

One of the excellent programs of the Monday afternoon period which dealt with reading in industrial arts was presented by B. Gordon Funk, supervisor of industrial education for the Los Angeles city schools. He outlined 10 important points in any good reading program. These include: (1) developing reading readiness, (2) reading to get the main idea, (3) reading to get important details, (4) reading to answer specific questions, (5) reading to evaluate, (6) applying what is read, (7) de-

heard and overheard

Ed Claude (president of AVA):

"We've had some good meetings here even though the attendance has been somewhat smaller than we expected."

Harold Silvius (Wayne State professor)

"I think William Steinberg did a wonderful job in his talk on telling the industrial arts story."

James Finn (on the shop of the future):

"We're going to have to use a lot more mass instructional devices. Industrial education people should want to do this."

Mark Nichols (past president of the Utah Vocational Education Association commenting on his trip to Russia):

"Education is the first order of business in Russia, and it's a big business. America needs to be more conscious of vocational education, and it should be put on top of our present education needs."

Samuel Fick (chief of the bureau of industrial education of California):

"We're going to have to train people for the next decade for occupations that we are not even aware of at the present time."

Clyde Bowman (Former Dean of Stout State College):

"The AVA has maintained its high standards over the years — a very good program."

J. Lyman Goldsmith (General Chairman of the local steering committee after seven hard days of the convention):

"I'm taking the post-convention trip to Hawaii to recuperate."

veloping a vocabulary, (8) outlining and summarizing what is read, (9) reading for implication, and (10) improving or increasing reading rate. Mr. Funk illustrated how these specific reading skills could be developed in the school shop. He used as examples the information needed to read the label on a paint can or to interpret the gauges on mechanical devices found in the industrial arts shop. He demonstrated effectively in his presentation that all technical learning could be strengthened through the reading program.

3. Tuesday

On Tuesday, Dr. John T. Walsh, director, trade and industrial education branch of the U. S. Office of Education, presented a very fine program in the trade and industrial education section on training in an atomic age. In his topic "Meeting the Challenge of Quality Through In-service Training," Dr. Walsh pointed out examples of the fact that we are living in an age of technological change. One example he used is the transistor which in the period of five years has revolutionized the entire area of electronics. Dr. Walsh indicated that today the technician must know not only how, but *why* and that this training must involve ideas, processes, and procedures. According to Dr. Walsh, of the one million people enrolled in technical and industrial education classes, over 600,000, or about 60 per cent, are in in-service programs. However, only three per cent of the skilled workmen and craftsmen are enrolled in any kind of trade extension classes. Dr. Walsh feels that the major problems of in-service training in a technological age include careful selection of instructional personnel, adequate salaries, a program of instructor training, and adequate instructional materials.

4. Wednesday

On Wednesday, the industrial arts division and the trade and industrial education division enjoyed a joint meeting with the theme "A Balanced Program of Industrial Education in the High Schools in the United States." This was one of the highlights of the convention. Dr. S. M. Brownell, superintendent of schools of Detroit, had as his topic "Preparation of All Pupils for the World of Work." Dr. Brownell first reviewed the great cities' school improvement program as outlined by the superintendents of a dozen of the largest cities in the United States. The high points are as follows:

1. Changes are taking place that are effecting the work force of this nation.
2. There are decreasing opportunities outside school for the less well prepared to fit themselves for jobs.
3. Preparation for the world of work invoives the entire school program, not

(Continued on page 50)

a joint convention for the AVA and AIAA?

The proposal is as simple as this: that the above two organizations plan a convention in the same city, on the same date, with a central commercial exhibit shared by both groups. That each organization will plan its own program and will have a separate headquarters hotel, if they so desire. And that next year the combined group will meet at the date and location of the AVA (or AIAA), and the following year on the date and at the location of the AIAA (or AVA).

What are the advantages of this arrangement?

1. For the average individual it means attending only one national convention instead of two. This will be a considerable savings and will give the busy person more time for his own school responsibilities.

2. The larger, combined group will get better publicity. It will also mean larger attendance at the convention. Many of the leaders in industrial arts and trade and industrial education are interested in both the AVA and the AIAA. Many individuals now must alternate, attending one convention one year and the other convention the next year.

3. For the advertiser it will mean a better convention from a business point of view. He will be able to see more people and make more contacts. He should be able to spend more time and money on his booth to make a "top notch" commercial exhibit.

What are the disadvantages? There are a few people who feel that the two groups do not have a common purpose or philosophy, and are not compatible.

Officers' Opinions

To gain an insight into the attitude of leaders of both organizations, as well as what exhibitors think about this proposal, your editors asked the following officers for their comments:

Ivan Hostetler/President, AIAA

"To have the AVA and the AIAA hold their conventions at the same time and in the same city undoubtedly has some merit. It certainly would seem advantageous to the exhibitors and to those who attend both conventions. However, the AVA is a large organization which is primarily concerned with the improvement and promotions of vocational education; the AIAA is not as large, but is a growing organization. In fact, it is one of the fastest growing departments in the N.E.A. and we have reasons to believe it will grow even more rapidly in the years ahead. Its primary function is to improve and promote industrial arts as general education. Both organizations are large enough and so different in their overall objectives that it would seem best to continue with separate conventions."

Ray Karnes/Past President, AIAA

"Well, it might be helpful to do that, but it would be difficult to arrange. However, this doesn't solve the major problem. We need just one industrial arts organization, we're splintered into two. Getting together this way for a convention might help us move towards the formation of one."

Ed Claude/President, AVA

"A joint convention would be looked upon with a great deal of favor by the AVA. This was discussed in the executive committee and everyone seemed favorable to this sort of thing. Even before it was discussed, we had talked with the vice-president, and he had agreed that the policy and planning committee of the industrial arts division of AVA would try to get together with the policy and planning commitee of the AIAA to see if it didn't have a lot of things in common that we should be working on together."

H. H. London/Past President, AVA

"I certainly agree with Dr. Karnes that we've got too many groups in our professional organization. People therefore, are plagued with the necessity of either refusing to join some of them, or turning over to various treasurers a considerable amount of their salary. I think that the time is ripe for us to take the American Industrial Arts Association and the industrial arts section of the American Vocational Association and amalgamate them, and have one organization that we can have unity in this phase of industrial education."

Harry Sears/President, The Ship

"I think a joint convention would improve the meeting for both groups. They could retain their separate identities. From the exhibitors standpoint, and also from the economics for the individual, I think it would be beneficial to all. I think it would be one of the best moves that the two organizations could make."

Hostetler

Claude

Karnes

London

It's What's Up Front That Counts

GAIL PHARES

- **We need to explain the what and why of industrial arts to the public, as well as to fellow educators.**
- **This article explains how to "sell" our field through an effective p-r program of county fairs, TV, the PTA, faculty meetings, displays, etc.**

Much of the curriculum of industrial arts has been patterned after industry. Perhaps the time has arrived when we need to follow another practice of American manufacturers — as well as all industry, in general. They invest millions of dollars annually in advertising to acquaint the public with their product. Is our problem of selling industrial arts different? We want our potential customers to become acquainted with our product. Are we sure they know what we mean when we say industrial arts? Sloyd, manual training, wood shop: these they might have encountered in school but too often we find confusion even among the school people. Many persons consider industrial arts as some kind of drawing for industry, a combination technical illustrator and commercial artist.

One of our responsibilities as industrial educators is to be sure the public knows the what and why of industrial arts. Another obligation that goes with the job is that of an informed parent and student. While in many schools there may be a minimum of required industrial arts, it is not long until the student must select his elective courses. Will it be biology, mixed choir, European history, or electronics? (Corvair, Valiant or Falcon will, to a great extent, be influenced by its advertising.)

Mr. Phares is supervisor of industrial education, Burbank Unified School District, Burbank, Calif.

The County Fair

A colorful part of our American heritage is the county fair. At the last Los Angeles County Fair, students and teachers of selected schools in Los Angeles County ran simulated classes in a typical general shop completely set up on the fair grounds. In the graphic arts area, distributed material describing industrial education was being printed by students and distributed to all fairgoers who visited the "shop." Junior and senior high students were also working in the areas of drafting, metalwork, and woodwork. Outside the instructional area, on display boards and in illuminated cases were projects and problems as approached through industrial arts. Wherever there's a county fair there is an opportunity to advertise. What commercial venture wouldn't pay hundreds of dollars to have its product on display to so many interested people? People are always interested when they can watch boys working productively.

One of the space-age dilemmas confronting the American public is that of determining what is the best education for our youth. In most instances they are looking to our educational leaders for direction. Dr. Conant's statement at the Chicago A.V.A. convention indicated some insight into vocational education and industrial education. Yet it appears that he, and other educators and laymen too, apparently do not fully understand the place of industrial arts education in the general education of all youth. If the leading spokesmen for our profession are not clear about industrial arts, we have indeed a job to do. We have a good product — the best general education for a technological society. It can stand on its own merits if the public is informed. We need to not only teach about American industry but we should also recognize, as they do, the value of keeping our product before the public.

Use Television

Television has been a powerful aid in forming public opinion. Where would Kools be without their penguin, General Electric without progress, or perhaps you can brush your teeth after every meal. With a little concerted initiative your own local industrial arts or industrial education group can tell their story on the television stations in your area. And don't fail to use the personality power of your students on television. They are some of our best ambassadors, free of educational jargon and cliches. While displaying the student's work be sure to point out to the viewer the true purpose of the project; the kinds of learning, understandings, and appreciation that accompany the student's work.

Don't Forget the PTA

In the final analysis where can the student turn for assistance in selecting his courses? Parents are probably the strongest influence, followed by counselors, teachers, and fellow students. Numerous devices have been used to acquaint parents with school activities and offerings; panel discussion, role-playing, lectures, and pamphlets to mention a few.

One of the most successful school public relation techniques this writer has participated in involved the PTA. It was a true learn-by-doing experience.

facets of telling the I-A story —

The PTA mothers actually constructed a project in each of the various industrial arts areas. Not only did they enjoy their work but they came away with an understanding and appreciation of industrial arts they could have acquired no other way. Safety had a real meaning as did technical information, skill and an appreciation of workmanship: this was an interested audience, eager to learn, which is the dream of every teacher.

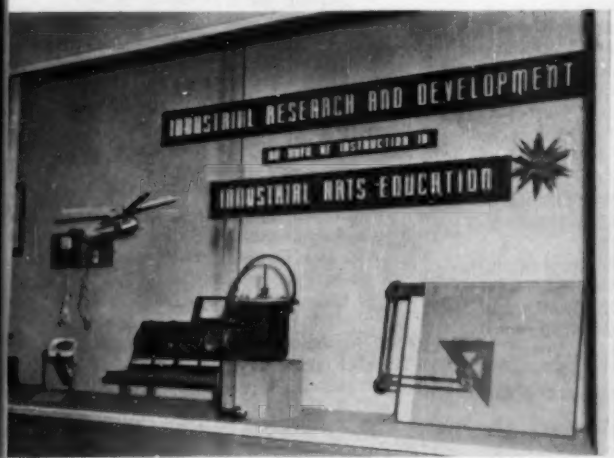
Peer Understanding

Have you ever had a faculty meeting in the industrial arts shop area? This is an excellent chance to acquaint the staff with what industrial arts can do for all students. Perhaps we might be forced to wash a little dirty linen if we knew our peers would be examining our wares.

Let's exploit the school display case to its utmost. Probably we reach more students more times by the display case than any other way. The school paper, person-to-person conversation, open house to the rest of the teaching staff, and doing an outstanding job in the classroom — all these might help to produce more educators and laymen who would say, "Don't you think everyone should study industrial arts?"

1. Industrial educators discuss the future of I-A on a local television program.

2. PTA mothers participating in a school-sponsored workshop.



3. The display case is a valuable device to inform students, teachers, etc., on what's new in industrial arts.

4. At a county fair students work on projects and problems just as they would in a general shop for passers-by.

N. S. MAURER

Role of the Department Chairman

- Mounting school enrollment, along with an increasing complexity of subject matter, has created the **need for more supervision and more departmentalization.**
- From this has **emerged the position of department chairman** and here is a **checklist of this individual's role** as viewed from his duties in supervision, administration, and leadership.

At first glance, supervision and population growth seem to have little in common. Yet, as the enrollments in many of our suburban schools increase, more and more departmentalization is taking place. As a result, busy school administrators are recognizing the need for individuals with special training and background to deal directly with the various areas of the curriculum. In many schools, there is emerging the position of department head, chairman, or supervisor. Regardless of the title, it is a part of an expanding pattern of supervision.

The concept held by the administrator, the teacher, and the supervisor relative to the role of the department chairman influences the level of effectiveness at which the appointed individual is able to perform. In general, the responsibilities of the department chairman should result in the development of high quality learning situations. In order to present a clearer picture of the role of the industrial arts department chairman, some of his specific duties are enumerated.

The duties and responsibilities of the industrial arts department chairman cover the areas of supervision, administration, and leadership. The more clearly defined the position, the more efficiently the department will be managed. In general, the industrial arts department chairman formulates the broad policies for the department and, when approved, interprets them to others and assures that they are implemented.

Mr. Maurer is chairman of industrial arts department, Colonie Central Schools, Albany, New York.

I. Supervisory Responsibilities

A. STAFF RELATIONS

1. *Staff Meetings*
   - *a*) Plan and conduct effective staff meetings using group dynamics.
   - *b*) Provide resource people, materials, and concepts.
   - *c*) Relay administrative information to staff.
   - *d*) Encourage staff members to accept varying roles of leadership.
2. *Shop Supervision*
   - *a*) Make periodic shop visits and arrange for follow-up conferences.
   - *b*) Insure that all safety regulations are observed.
   - *c*) Encourage staff to maintain high standards of shop management.
   - *d*) Enable staff members to realize their maximum potential by offering suggestions relative to planning lessons, selecting materials, evaluating practices, and managing the shop.
3. *Curriculum Development*
   - *a*) Provide leadership and facilities for the revision and preparation of courses of study to insure an integrated program.
   - *b*) Ascertain that accepted courses of study are implemented.
   - *c*) Encourage staff members to develop new instructional methods.
   - *d*) Secure resource personnel to assist in course development.
4. *Physical Facilities*
   - *a*) Co-ordinate the planning and equipping of new and/or existing industrial arts shops and prepare the necessary specifications.
   - *b*) Encourage staff members to develop attractive and cheerful shops.

B. EVALUATION

1. *Program*
   - *a*) Review each course's contribution to the industrial arts program, suggesting methods of improvement.
   - *b*) Review department's contribution to the total school program, suggesting methods for improvement.
2. *Instruction*
   - *a*) Make periodic evaluations of instructional methods used by staff members.
   - *b*) Evaluate books and other instructional material used.
   - *c*) Review and co-ordinate the department's testing program.
   - *d*) Formulate and supervise special testing procedures.
   - *e*) Encourage staff members to evaluate their instructional program.
3. *Records*
   - *a*) Evaluate records maintained by staff and suggest others essential for efficient instruction.
   - *b*) Evaluate own records to insure effective supervision.

II. Administrative Responsibilities

A. PERSONNEL

1. *Relationships*
   - *a*) Serve as a member of the administrative advisory council.
   - *b*) Inform administration of department's progress.
   - *c*) Complete delegated administrative requests promptly and efficiently.
   - *d*) Act as a liaison between administrator and teacher; pupil and teacher.
   - *e*) Acquaint new teachers with department and school policies.
   - *f*) Assist substitute teachers in carrying out their assigned duties.
   - *g*) Suggest methods of dealing with pupils presenting special problems.
   - *h*) Relieve assigned teacher permitting him to perform other duties.
   - *i*) Co-ordinate the Cadet Teacher Training Program.
   - *j*) Advise relative to teacher-pupil conferences.
   - *k*) Advise relative to teacher-parent conferences.

2. *Recruitment*
   a) Participate in selecting new staff members.
   b) Recommend staff members for appointment to tenure.
   c) Advise administrator concerning staff assignments.
3. *Evaluation*
   Provide administrator with evaluation reports of staff members.
4. *Teacher Welfare*
   Maintain vigilance relative to working conditions of staff.

B. CURRICULUM

1. *Basic Philosophy*
   a) Identify aims, objectives, and policies for department.
   b) Interpret local and state policies to staff members.
2. *Scope*
   a) Review total program periodically and suggest changes to keep courses up-to-date and effective.
   b) Recommend to administrator the adoption of the industrial arts program.
3. *Pupil Needs*
   a) Review course offerings periodically and suggest changes that effectively meet pupil needs.
   b) Determine entrance requirements for the various courses.
   c) Advise administrator concerning the optimum class size.

C. MANAGEMENT

1. *Budget*
   a) Prepare budget estimate for department.
   b) Advise administrator relative to budgetary needs.
   c) Maintain control over any budget reductions.
2. *Inventory*
   Insure that all inventories are properly maintained.
3. *Requisitions and Bids*
   a) Review all requisitions from and forward acceptable requests to administrator and/or business agent.
   b) Review all bids for equipment staff and forward acceptable requests to administrator and/or business agent.
   c) Review all bills for accuracy and approve for payment.
4. *Utilization of Department Equipment and Supplies*
   a) Insure that all equipment, supplies, tools, books, etc. are available and that they are used properly and effectively.
   b) Insure that each shop is prepared properly for vacation periods.
5. *Correspondence, Records and Reports*
   a) Conduct department correspondence and co-ordinate clerical work.
   b) Evolve and use forms and records for efficient administration.
   c) Prepare notices, announcements and information bulletins.
   d) Prepare charts for administrator showing pupil load, pupil distribution and enrollment changes.
   e) Prepare annual report indicating accomplishments, plans for growth, enrollment and course distribution, budget requests and suggesting necessary and desirable changes.
   f) Submit routine reports requested by local and state administration.
   g) Submit courses of study for approval to State Education Department.
6. *Miscellaneous*
   a) Greet and act as host to all visitors to the department.
   b) Interview book, equipment, and supply salesmen.

III. Leadership Responsibilities

A. STAFF RELATIONSHIPS

1. *Administration*
   a) Interpret industrial arts policies and procedures to administrator.
   b) Advise administrator relative to department scheduling problems.
2. *Guidance*
   a) Consult with guidance department relative to student selection.
   b) Provide guidance department with pupil progress records.
   c) Provide guidance department with promotional materials.
3. *School Staff*
   a) Co-operate with other chairmen to integrate the school's program.
   b) Interpret industrial arts to the faculty.
   c) Advise special teachers on purchase and use of equipment and supplies.
   d) Co-operate with all personnel to provide the best possible school.
4. *Industrial Arts Personnel*
   a) Encourage staff to improve the curriculum following local and state educational policies.
   b) Promote co-operation and harmony in the department.
   c) Inform staff of recent legal and educational developments.
   d) Conduct survey of teachers opinion on matters of common interest.
   e) Promote the industrial arts program within the school.
   f) Encourage staff members to make school and industrial visits.

B. COMMUNITY RELATIONS

   a) Prepare articles for school and local papers.
   b) Promote and arrange for industrial arts exhibits and displays.
   c) Serve as a resource person for community groups.
   d) Promote and encourage appropriate field trips.
   e) Promote and arrange for radio and TV programs.
   f) Co-operate with labor and management to develop an understanding of problems and goals relative to pupils entering employment.

C. PROFESSIONAL GROWTH

1. *In-Service Training*
   a) Promote and plan for appropriate in-service training.
   b) Encourage staff to participate in training programs, extension courses, summer school, and professional reading.
   c) Encourage staff to write professional articles and initiate appropriate research.
   d) Review and evaluate the effectiveness of own supervision.
   e) Keep informed on educational developments and events.
   f) Initiate appropriate research on educational problems.
2. *Professional Contributions*
   a) Prepare educational articles for professional publications.
   b) Address professional groups.
   c) Participate in local, state, and national educational organizations.
   d) Encourage staff to participate in local, state, and national educational organizations.

a creed for the department chairman

As a department chairman, I will endeavor to approach each teacher:

1. With an understanding that he has something he does well, that he has ideas to contribute, and that he is interested in improvement.
2. With an expectancy of co-operation, manifesting a friendly and understanding attitude.
3. With willingness and enthusiasm to share in new experiences.
4. With the recognition that all good learning is to a certain extent exploratory.
5. In the role of a helper, who is also seeking knowledge and information.
6. With tolerance, sympathy, understanding and patience.

— Maine State Department of Education

Effective Management Through Planning:

A. C. VASIS, JR.

- The teacher's ability to organize the teaching procedure may be, perhaps, the key to shop control: the difference between an effective and ineffective course in industrial education.
- This organization results from careful planning and here is a detailed analysis of this planning process, with concentration on starting the class.

While there are many ways of achieving control in the shop, careful organization and management of the shop is a key factor. This enables an instructor to teach to his best ability.

The instructor must determine what objectives he wishes his students to attain. When this is done, he must select, organize, and analyze learning experiences which the students will perform in order to attain these objectives. These learning experiences might be in the form of lectures, demonstrations, job sheets, projects, audio-visual aids, etc.

Next, the instructor must order supplies, tools, and equipment, and, upon their arrival, fit them into the shop layout which he previously made when the objectives of the program were determined. All these steps require careful planning. The time spent on organization of the shop will eliminate much otherwise wasted time while the shop is in operation. The instructor must also decide the type of personnel plan, tool and supply storage, clean-up procedure, roll call procedure, maintenance procedure, student requirements, shop rules, safety rules, and grading practices he will use. All these points should be carefully explained to every student so that the "why of it" is not a question in their minds. This will also bring the students to think of the shop as "our shop" and not the instructor's. This is an approach that has a great deal of merit. When the students have a feeling that they are a part of the shop, and the shop is for them, they will treat it as their own. This cannot be done overnight; with the correct type of shop rules and personnel plan, however, the students will acquire this feeling in a short period of time.

Many schools today set aside the first day of the school year for preparation. Then the teachers can properly organize their classes, records, etc., for the students' arrival. For the beginning teacher, this day is specially valuable in becoming acquainted with the layout of the shop; the equipment, tools, and supplies; the students' names; the school records; and other teachers and personnel in the building. There is usually a faculty meeting for introductions, instruction, and pertinent information. The shop teachers will most likely have a departmental meeting, at which many of the problems or questions of the beginning teacher can be answered. Seeking the assistance of these other teachers in arranging the shop may be helpful. Orientation day is also a boon to the veteran teacher who had been transferred to a new school, giving him a chance to get acquainted with the surroundings before the students arrive. Most of the faculty, having gone through the same experiences of encountering a completely new situation, will be eager to help the newcomers.

Mr. Vasis is with the Chicago Teachers College

The First Day

When the students arrive for the first time, the shop teacher should make sure that the shop is clean, the temperature is normal, the shop is well lighted and ventilated, and that there is a place for all the students to sit. The temperature, lighting, and ventilation of the shop play a large part in the general atmosphere of the shop. The instructor establishes his control at the moment the students enter the shop for the first time. This is a very critical moment of the semester. Much of his success or failure throughout the semester will stem from this initial encounter.

When the students enter, they should receive a friendly greeting and be told to take a seat immediately. Thus, when the period starts, all the students will be in their seats awaiting further instructions from the teacher. If the students are allowed to roam throughout the shop, talking, general disorder will result. With this technique the instructor can set down a precedent for succeeding days as well as establish complete order and co-operation the first minutes of the class.

After the bell rings, the instructor should introduce himself and announce the title of the course. At this point the teacher asks the students to stand in a particular place quietly while he calls each student's name and seats him in his permanent seat. If some of the students talk while being seated, it is a good thing to stop and insist on full co-operation. If the students can get away with a few minor things, these will soon grow into general disorder, forcing the instructor to spend a majority of his time on disciplinary problems instead of proper instruction.

Shop Rules

After the students are seated, the shop rules should be passed out, read, and the need for them explained. There must be a definite purpose for each rule, and the students must realize that. If the instructor has many shop rules with little reason for them or if there is no explanation or discussion about the rules, they will be of little value. Here again, the teacher must study his shop and the situation in general in order that his shop rules be purposeful. Having these shop rules, the students will know exactly what is expected from

Keystone to Shop Control

them and why. If they fail to comply, they will actually be penalizing themselves for they know in advance that failure to abide by the rules will result in such and such a penalty already set down by the instructor. Discussion of the rules and penalties will discourage violation of them.

After the instructor has completed his explanation of the shop rules, he may then describe the shop program. He should explain that in a few days the class will nominate and elect two students to serve as shop foremen. He should outline the shop foremen's duties and emphasize the need for picking students that are very capable.

On Safety and Fees

The instructor at this point may talk about safety in the shop, such as the need for doing jobs in a certain manner, for wiping oil that is spilled, etc. If there is a safety sheet that the parents must sign, it should be given out at the end of this talk on safety.

The teacher may want to describe his method of taking attendance. There are many methods of doing so. If the students have seats assigned to them, the instructor has only to walk down the row of benches when the bell rings. He marks absent the students whose seats are empty. This takes a few seconds and allows the boys to go to work soon after the bell rings. It also emphasizes the need for the students to be in their seats and quiet when the bell rings.

The instructor might talk about the shop fee now. He should tell the students why a shop fee is collected and where the money actually is spent. He should also specify a certain day when all shop fees must be turned in. Otherwise, there will be students who will bring them in as late as the fifth week of school and even later in certain cases.

After the dismissal bell rings, the instructor excuses the class. He must be alert at this time and make sure that every student walks out of the room in a gentlemanly manner.

The beginning teacher has just completed his first day of teaching. Everything should have been right on schedule and the students should know exactly what is expected of them. There should have been nothing left to chance and no questions that were left unanswered.

The Second Day

On the second day of class the students come in and take their seats quietly and wait for the bell to ring. Attendance is rapidly taken and the instructor immediately takes the students on a tour of the shop. Every piece of equipment is briefly explained and time is given to ask questions. When all questions are answered, the requirements of the course, the progress chart, and the types of personnel plans are discussed in detail.

After this is done, the most important subject in the minds of most students should be discussed. This subject is grading. What factors will determine a student's grade? A way that has proven successful is in having several factors determine the grade, each factor comprising a percentage of the ultimate grade. For an example, an instructor might count projects as 45 per cent, tests as 30 per cent, and working up to ability as 25 per cent. There are other factors, such as attitude, quantity, etc., that could enter into the grading plan. Some teachers might weigh these factors differently. Whatever the case may be, the students should know what these factors are and how much weight is placed on each. The factor of working up to ability is very important, as students will strive to do the best possible job if this is stressed.

The Demonstration

Now is the time for a professional demonstration of a project, job, or whatever the unit might be. Maybe a lecture is necessary to provide the students with some theory before the actual demonstration. This is another critical point. Every student will be wondering up until now whether the instructor is competent. Make sure all tools, supplies, and materials are laid out so the demonstration will not be interrupted.

After the demonstration is complete, followed up by a summary, questions should be asked. After all questions are answered, a toolkeeper should be selected and all other students sent to their work stations to begin work. The instructor can then devote his time to individual instruction, spending a little time with each student to make sure he has no questions or problems and has started the project correctly.

Some students will work faster than others; therefore, additional projects are necessary. The instructor can also use these students to help other students, for shop maintenance, inventory, and shop projects. The essential thing is to keep all students working at something worthwhile from the beginning of the semester until the very end.

The teacher's personality and character play a vital role in establishing and maintaining effective control. He must possess and display all the fine characteristics that he wishes his students to develop. These traits, such as fairness, honesty, friendliness, interest, sense of humor, open-mindedness, and good grooming create harmony and good rapport. The instructor should refrain from shaming, nagging, and threatening his students. These factors create problems and incite un-co-operative attitudes.

In Summary

Students must know exactly what is expected of them and the instructor should insist on the fulfillment of these expectations. The organization and management of the shop must be carefully done and considerable planning and thought must be given to starting the class. Once the teacher builds a good reputation, the informal atmosphere of the shop will allow the students the freedom they desire without causing discipline problems. This will result in the instructor's being able to teach to his full potential and the students attaining their objectives in pleasant, wholesome, harmonious surroundings.

Motivation for Basic Work Principles in Woodworking

DONALD G. HILLER

- **How to hold students' interest in elementary work principles before going on to more advanced wood projects can be a problem.**
- **Here is one solution: toys whose construction involves all primary tool operations.**

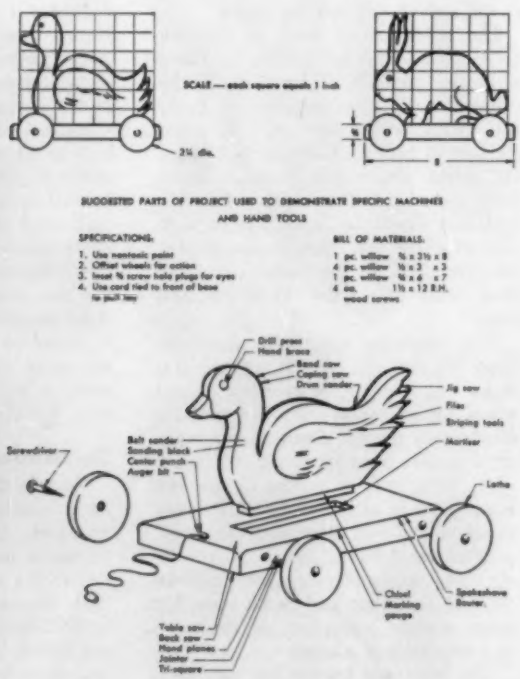
The success of any teacher depends largely upon his ability to provide student activity which produces individual student gains and achieves course objectives. This proper activity must be based upon motives for learning. In this article, the writer presents a plan of motivation that has been applied and tested in his beginning woodworking courses at East Leyden High School, Franklin Park, Illinois.

Prior to the planning of more complicated and time-consuming woodworking projects, it is essential that students learn many basic principles or operations involved when working with woods, hand tools, and machines. They must be taught acceptable safe work habits, proper attitudes, proper hand tool and machine manipulative skills, project planning as related to drawings, use of materials and costs, industrial applications and other related information, and conservation of materials.

A series of simple, colorful, action toys was designed to be used as the vehicle or motivational device through which the desired student gains and course objectives were obtained. Each student was required to develop a complete set of working plans, including material lists and costs, drawings, and machine and hand tool operations involved to complete this first project.

Each machine was demonstrated by the instructor, showing operations, parts and their relationships, and safety features. Stock was issued to students, the layout of the object was transferred to the wood. Upon completion of each machine or hand tool demonstration, the students (in a "Monkey See, Monkey Do" fashion) applied the in-

Mr. Hiller is an instructor of woodworking at the East Leyden High School, Franklin Park, Ill.



One of Mr. Hiller's classes is shown above with the simple, action toys which were built by the students while learning basic working principles. At right are working drawings and specs for the toy.

struction or application of each operation to the gradual completion of the toy. An example of this phase would be "to cut irregular or curved surfaces with the band saw or coping saw." Each student then acting as "guinea pig" would cut a curved section of the project. Demonstrations followed with emphasis on safe practice when using the hand tools and machines involved in the construction of the toys. At the completion of machine and hand tool demonstrations, each student had a project nearly ready for assembly. Prior to teaching final assembly procedures, the students were taught — through the use of movies, charts, and other visual aids — technical and guidance information related to occupational trends, mass production techniques, methods of finishing, and origin and conservation of materials.

A final evaluation of the entire unit proved to be most rewarding to the students and the instructor. One hundred and forty toys were completed and labeled. Students who made the projects worked in conjunction with students active in school clubs and organizations; as one group they distributed the toys to local orphan homes, hospitals, homes, and churches throughout the area.

Course content in view of future and more complex instruction became more meaningful to the students, and future teaching became more effective as a result of reaching the following predetermined gains and objectives:

1. How to properly operate machine and hand tools
2. How to operate machines and hand tools safely
3. How to identify machine and hand tools parts, and their relationship
4. How to perform specific operations
5. How to use common finishing materials
6. How to use common woodworking supplies
7. How to use leisure time to a worthwhile end
8. Application of group and individual planning
9. Application of simple industrial techniques of mass production
10. Understanding of costs in reference to profits and loss
11. Understanding group co-operation
12. Understanding and application of accepted personality traits, attitudes and work habits
13. Understanding and operating personnel systems and the application and relationship to the growth of the classroom or place of employment
14. Occupational information — job opportunities
15. Opportunity to give help to others
16. Understanding inspection techniques
17. Understanding and locating prospective markets
18. Understanding the values of better school — community relations.

▶ Try a display board on how industry produces —

Providing Activity — Projects Plus

LOUIS R. CECIL

The first question usually asked by a beginning class in industrial arts is the proverbial one: "What are we going to make?"

This interest in wanting to make things is the clue to what can be done by the alert and forward-looking industrial arts teacher. If this interest is channeled in the right direction, it can have the answer to the many ills that have troubled industrial arts programs.

Project making for the sake of making, however, is not enough.

The success of a good program should not be measured by what is made, but rather by how the program prepares the boy to go out into the industrial and business world. Many of our boys and girls will someday take their places in industry, business, or the services related to business and industry.

Our country is known for its ability to produce and make. Our industrial might and know-how have made these things possible. We are in an era of space and missiles. The scientist without our industrial might, know-how, and the vast army of industrial workers associated with him would be ineffective.

Boys and girls learn in other classes about our natural resources, our raw materials, our leading industries, our farms, our products, but how industry, business, and the work-a-day world are organized to produce and make things is far from their realm of learning.

To get students closer to industry, to know its language, its tools and machines, and the vast family of workers engaged in its many occupations, industrial arts pupils at Mill Plain Junior High School engaged in an activity that has created interest and new learning.

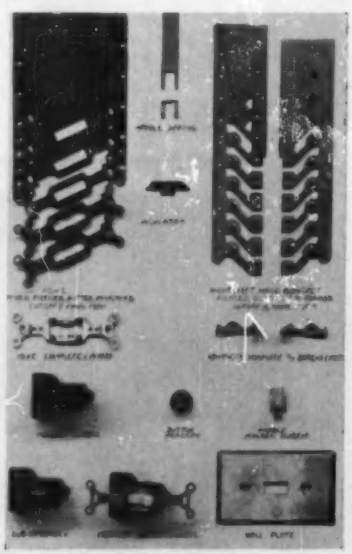
Each boy is required to make a display board approximately 22 by 28 in. or larger. On this he is to show how industry, through industrial organization, raw materials, processes, operations and occupations, makes products for industrial and consumer use.

The boys get their materials and information by going to industry, business, or whatever the work is performed. In this industry and business have been most co-operative. Many of the boys have fathers who are in industrial or business positions, thus making it possible to get much valuable information.

Upon completion of the display boards each boy explains his project to the class. These talks lead to many questions from which stem other assignments and learning situations — all of which get closer to industry and its organization.

The writer supplements these talks with field trips to industry and business. In place of field trips, representatives from industry or business come to the school and give talks and demonstrations pertaining to industrial organization, raw materials, processes, operations, products, and occupations.

Mr. Cecil is an instructor of industrial arts, Mill Plain Junior High School, Fairfield, Conn.



Typical display board, showing how industry fabricates a mercury switch.

▶ A metals project with boy appeal —

TRY A WIND DEFLECTOR

EVERETT V. TRAYLOR
Assistant Professor of Industrial Arts
Nebraska State Teachers College, Peru

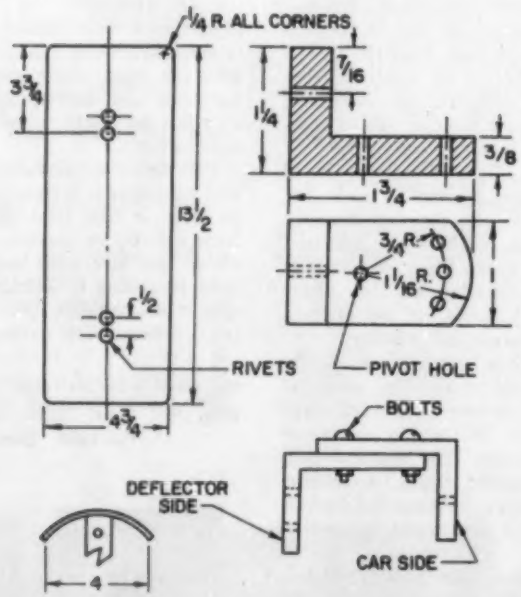
Students can easily assemble tailor-made wind deflectors for the family station wagon and pocket a substantial savings.

These wind deflectors were made at the time when auto suppliers did not have wind deflectors for compact station wagons. Longer deflectors could have been bought and cut down to size. They would have cost about $8.50 to buy, but the chrome plating would likely have peeled from the cut-down edges and rusting begun. Now deflectors of the correct size are becoming available but the cost is still high.

Any station wagon owner who uses wind deflectors will praise their usefulness in keeping the rear window clean on rainy, slushy days and on dusty roads.

To make a set, determine the size of pieces needed. Get a tape measure, fairly stiff cardboard, and scissors. Lay out the rectangular size small enough to allow the door or doors to open properly. (Or lay out a slight parallelogram shape if preferred.)

The measurements shown in the drawing are for the 1960 Valiant wagon and should be used as a base for calculating other wagons' needs.



Procedure

The general procedure is as follows:

1. Cut bracket parts.
2. Smooth edges of bracket parts and deflectors.
3. Curve deflectors on the slip roll.
4. Round four of the bracket ends to conform to the deflector curve.
5. Drill holes in deflectors.
6. Line up bracket end on deflector and mark through deflector holes to locate holes in bracket ends.
7. Drill joining holes of separate bracket pieces using the following procedure: Clamp the two pieces together and drill the pivot hole first. Place the bolt in position and drill the center hole opposite the pivot. Next move the inside bracket part until the top hole is 1/8 in. away from the edge, then drill again using the center hole of the outer bracket part as a drill guide. (All holes will line up properly this way.) The other hole is drilled in the same way.

The "outside" bracket part will have only two holes; the inside one will have four as shown in the diagram.

If you don't need adjustable brackets, fabrication is much simplified by using aluminum U channel. This will eliminate drilling and joining two pieces to form each bracket.

(Angle parts for the adjustable deflectors may be cut from ALCOA angle, Section Number 3579. Fixed brackets may be cut from ALCOA channel, Section Number 1929, to space the deflectors 2½ in. from the car rail, or number 3605, to space them 2¾ in.) ◀

Bill of Materials

.064 ga. tempered aluminum (or other stainless metal).

3/16 in. rust-proofed sheet metal screws for fastening bracket to car.

1/8 in. aluminum rivets for fastening deflector to brackets.

1/8 in. rust-proofed bolts for fastening bracket parts together.

Aluminum angle bars as shown in drawing.

It is best, but not imperative, to employ the use of sheet metal shears to cut the deflector parts to size and to form the curves.

TRI-SHEET WELDING SHIELD

J. C. BRUECKMAN, JR.
General Metal Instructor
West Seneca, N. Y., Central High School

The welding area in a unit metal or general shop has always presented some problems when group welding demonstrations were scheduled. Generally the demonstrations are limited in size to a group corresponding to the same number of shaded glass shields. This condition not only exists for oxyacetylene and electric arc welding demonstrations, but also for brazing and cutting.

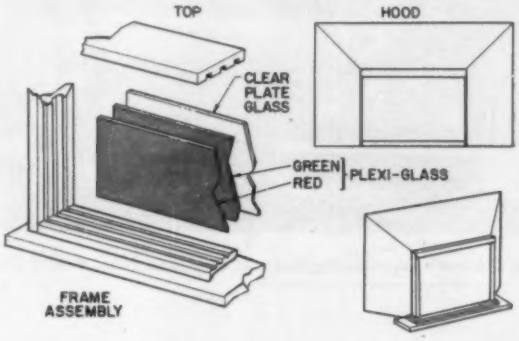
It logically follows that if a large screen were available which would enable an entire class to be shielded during a demonstration, the problem would be solved. However, to construct an optically safe screen for electric welding the most suitable material would be shaded glass. It is readily available, but at a cost of 15¢ a square inch. This figures that a small screen one by two ft. would cost over $40 for the shaded glass alone. Another drawback would be that such a screen, dark enough for electric welding would be too opaque for oxyacetylene work.

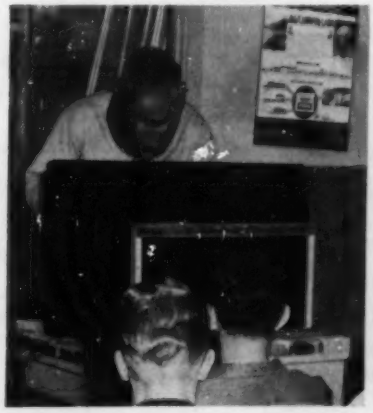
It is, therefore, for such reasons of utility and expense that the tri-sheet welding shield was developed. The tri-sheet refers to the combination of sheets of transparent plexiglas and plate glass, the mounting of a sheet of red plexiglas and a sheet of green plexiglas in a frame so that either may be removed if necessary for the various types of welding. Together the sheets will provide a good shield for the electric arc flashes. Separately, either using the red or green sheet, an ideal shielding condition is provided for oxyacetylene work.

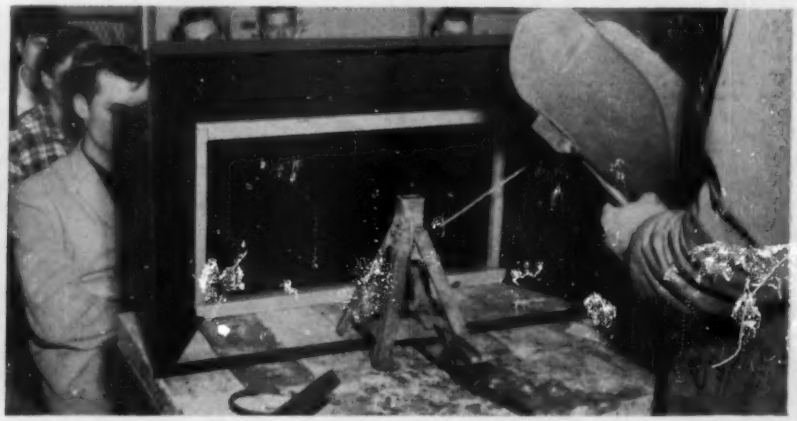
Ideal as the conditions are for light absorption with a plexiglas shield, one major factor concerning the arc of electric welding must be overcome. This involves the elimination of any ultraviolet rays from the arc passing through the shield. This is successfully accomplished by using a sheet of plate glass which filters out all harmful rays and also protects the plexiglas from heat and spattering molten metal. The dull black hood is also essential because it confines any reflections and flashes caused while welding behind the screen.

The entire unit, as pictured, was constructed in the industrial arts laboratories at West Seneca Central High School for less than $5.

The shield has been used for all welding demonstrations in the general metal working course with definite success. This is not to imply that the use of the shield has eliminated the need for individual instruction in the welding booths. However, during the demonstration using the shield the instructor is able to face the group and explain the various techniques being demonstrated and also discuss the answers to any questions as they arise.

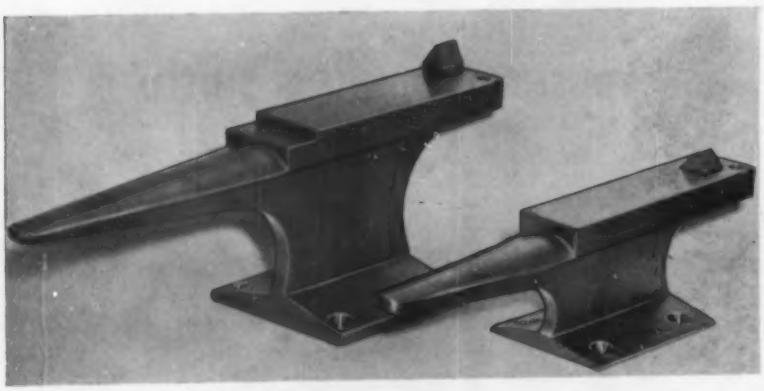




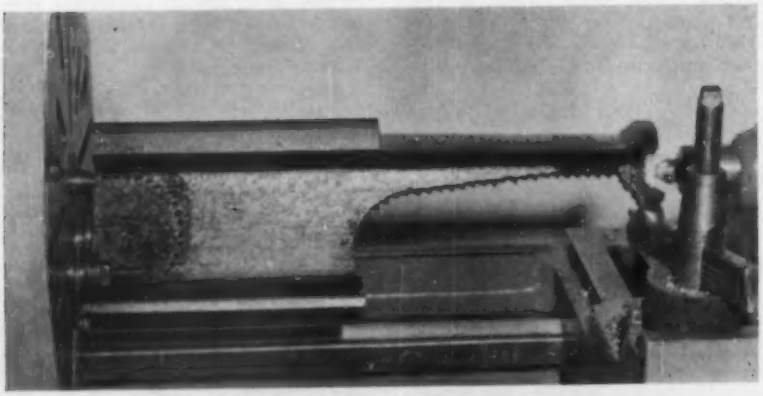


ANVIL FROM A RAIL

WAYNE COLLINS
Machine Shop Instructor
Hobart, Ind., High School



The finished anvils.



Turning the horn by running the rail between Nos. 4 and 2 centers.

Shaping all flat surfaces of the face on the shaper.

When man found that he needed metal in different sizes and shapes, he also realized that he must have something upon which to pound this metal into the desired shape. So he devised the anvil. We often associate the anvil with the old-time blacksmith, but even to this day some forms of anvils are used in our most highly mechanized industries.

For the past six years in our shop, we have been working on the machining procedure for making an anvil from a railroad rail. The following directions and blueprints are the results of our experiences. While the dimensions are suitable, you may want to experiment with different tailstock setovers, etc. We held the overall length to 17 in. because of the limitations of our shaper.

We have worked both the 85 lb. and 140 lb. rails and find that the metal of the 140 lb. rail works a little harder than that of the 85 lb. rail. You may want to soften either rail before starting the machining of the metal.

The blueprint explains where the different centers should be located. The rails we get from different railroads are sometimes badly rusted and take a little more machining that a good one.

The drawings are based on the 85 lb. rail.

Procedure

1. Secure a piece of rail about 17 in. in length.

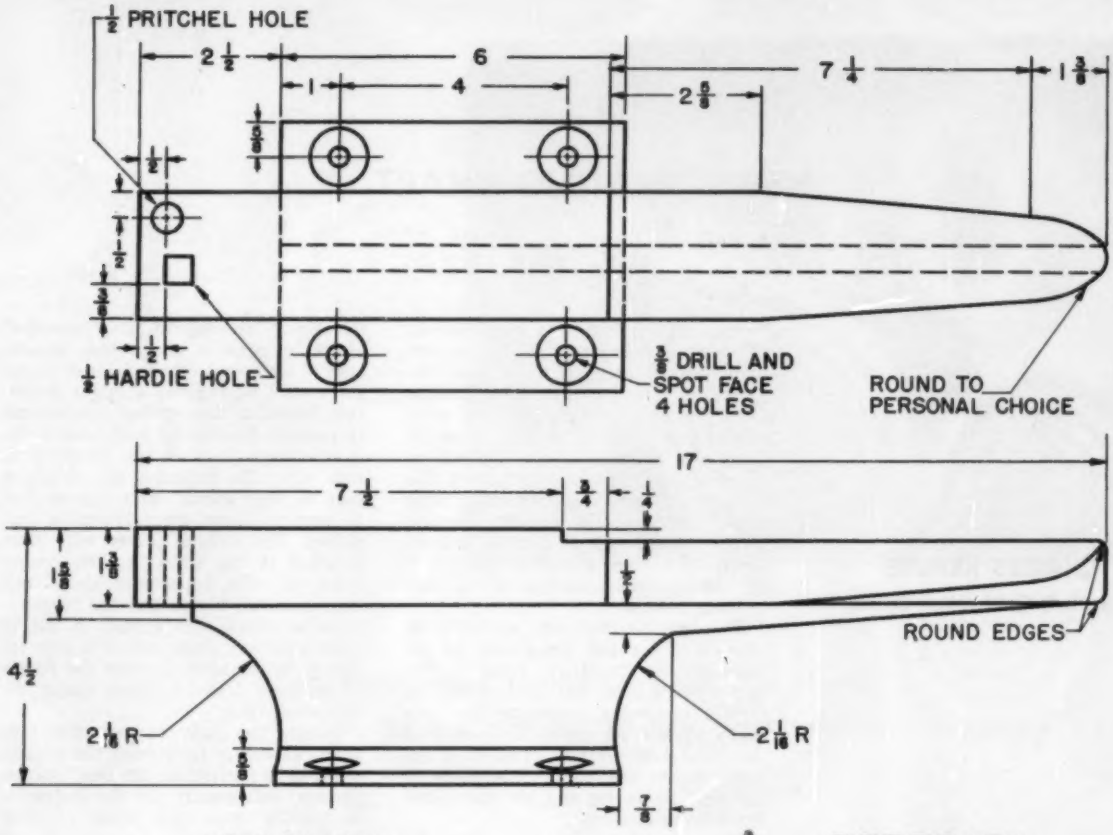
2. Lay out and drill the centers with a No. 5 combination drill and countersink.

(*For the 85 pound rail* —
Tailstock end:
Nos. 1 and 3 centers, $1\frac{3}{16}$ in. from the top and near the edge
No. 2 center, $1\frac{1}{2}$ in. from the top and in the center of the web
Headstock end:
No. 4 center, $2\frac{1}{4}$ in. from the top and in the center of the web.)

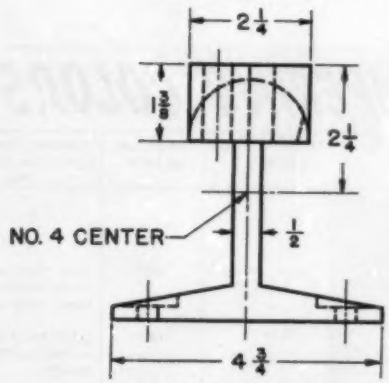
(*For the 140 pound rail* —
Tailstock end:
Nos. 1 and 3 centers, 1 in. from the top and near the edge
No. 2 center, 3 in. from the top and in the center of the web
Headstock end:
No. 4 center, $2\frac{3}{4}$ in. from the top and in the center of the web.)

3. Lay out and remove the excess material from under the horn. Be sure to leave the centers in. You may want to use a high speed drill and drill overlapping holes in the excess material.

4. Lay out and drill small pilot holes

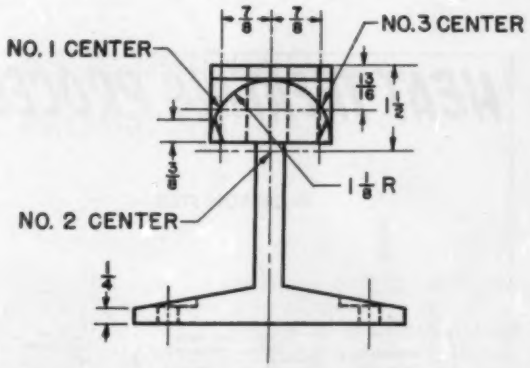


LEFT END VIEW



HEADSTOCK

RIGHT END VIEW



TAILSTOCK

in excess material under the hardie hole end, but do not remove the excess material at this time.

5. Offset lathe tailstock ¾ in. toward operator.

6. Run the rail between Nos. 4 and 2 centers and begin turning the horn.

7. Turn down the horn until you have undercut about ⅛ in. both sides of the face at the back end of the horn. (Do not remove any centers!)

8. Roughly square the shoulder between the horn and face.

9. Change to No. 1 center on tailstock and cut desired taper on one side of the horn.

10. Change to No. 3 center and cut taper to match other side. You may remove No. 1 center at this time.

11. Change to No. 2 center and finish top of horn. The remaining excess material will have to be taken off by shaper or by grinding.

12. Finish squaring shoulder at rear of horn.

13. Remove from lathe and remove excess material under hardie hole.

14. Transfer to shaper and square all five surfaces of the base.

15. Turn anvil over and shape all flat surfaces of the face.

16. Set anvil in shaper vise for cutting tapered web under horn. We use the surface gage on the kays of the shaper to set the taper.

17. Shape the underside of the face where hardie and pritchel holes come through. We undercut this a little in order to get the full stroke of our shaper.

18. Grip the face and base between vise jaws and rough cut the body and underside of the face. Finish cut the body and the underside of the face.

19. Set the shaper head at 12 deg. and shape the base angle. (15 deg. for 140 lb. rail.)

20. Turn the rail over and repeat steps No. 18 and 19.

21. Transfer to the milling machine and cut both radii.

22. Lay out and shape the hardie and pritchel holes.

23. Make and fit hardy to hardie hole.

24. Drill and spot face holes for fastening to the bench.

25. Finish grind or file all over.

HEAT TREATING CHART

CHARLES KRAUSE
Red Bluff, Calif., High School

When demonstrating to shop students the heat treating process for carbon steels and the tempering colors involved, it is often difficult to describe to the student how the various steps of the process relate to each other. It is equally difficult for the student to see and study the appearance of the tempering colors during the actual tempering operation. This can be overcome by the instructor if he uses an instructional aid in the form of a chart showing the important aspects of the heat treating process.

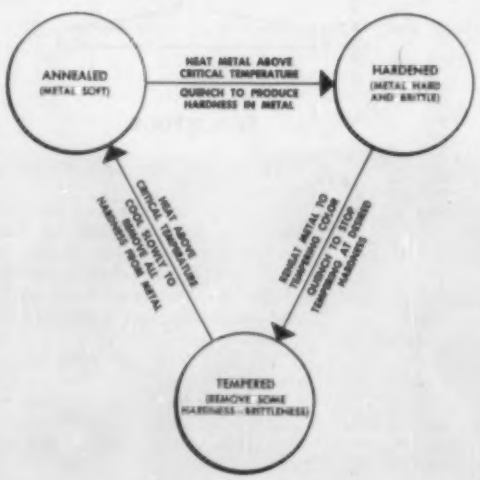
This heat treating chart has been developed to illustrate graphically the relationship of the basic steps of the heat treating cycle and to show the authentic tempering colors as they actually appear on metal. Diagramming the basic heat treating cycle as a triangle shows how each cycle leads to the next by performing the operations listed between them.

The tempering colors have been authentically reproduced on individual pieces of metal to give a true appearance to the colors. Small pieces of 18 ga. sheet steel were given a bright polish, then heated to the required temperature to produce the desired tempering color. A full range of colors was produced in this way. To preserve the colors a coat of clear plastic spray was applied to prevent them from becoming tarnished. The colored pieces were than attached to the chart in their proper order of color appearance along with their common names and the temperatures at which each appear. A list of some common shop tools was also included on the chart to show the degree of hardness drawn in them during the tempering cycle.

Having this chart for instruction purposes, as well as for guiding the student while he is performing the heat treating process, will greatly aid the instructor in putting over this phase of shop work.

HEAT TREATING PROCESS

— CARBON STEEL —


ANNEALED
(METAL SOFT)
HEAT METAL ABOVE CRITICAL TEMPERATURE
QUENCH TO PRODUCE HARDNESS IN METAL
HARDENED
(METAL HARD AND BRITTLE)
REHEAT METAL TO TEMPERING COLOR
QUENCH TO STOP TEMPERING AT DESIRED HARDNESS
HEAT ABOVE CRITICAL TEMPERATURE
COOL SLOWLY TO REMOVE ALL HARDNESS FROM METAL
TEMPERED
(REMOVE SOME HARDNESS - BRITTLENESS)

TEMPERING COLORS

COLORS ON METAL	TEMPERING COLOR NAMES	TEMPERATURE OF METAL	TEMPERING HARDNESS RANGE FOR COMMON TOOLS
HARD			
	LIGHT STRAW	400°	LATHE TOOL BITS HAND SCRAPERS SMALL TWIST DRILLS
	STRAW	450°	LARGE TWIST DRILLS MILLING CUTTERS REAMERS
	DARK STRAW	475°	TAPS — DIES WOODCUTTING TOOLS HAMMERS
	BROWN	500°	PUNCHES COLD CHISELS KNIFE BLADES
	PURPLE	525°	WOOD CHISELS AXE BLADES SHEARS
	DARK BLUE	550°	HACKSAW BLADES WOOD SAWS WOOD DRILLS
	LIGHT BLUE	575°	SCREW DRIVERS SPRINGS
	PALE BLUE	600°	
SOFT	GRAY	650°	
	DULL RED	700°	ANNEALED

▶ An approach toward correlating the efforts of the fine and practical arts departments —

CONSIDER MOSAIC TILES AS A UNIFYING FACTOR IN SCHOOL PROGRAMS

SAM R. PORTER
Teacher, Industrial Arts (on leave)
Ramona High School, Riverside, Calif.

The recent surge in popularity of ceramic mosaics can be used as a unifying factor in a school program. The art and industrial art departments, often distant in objective and philosophy, can find common ground and rewarding co-operation through the use of these colorful bits of mosaic tile. School mosaic exhibits usually show that the art and industrial art departments are not taking advantage of each other's resources. For example, art classes often do beautiful mosaic work but mount this work on table and furniture bases of rather poor design and construction. On the other hand, some industrial arts classes detract from well-rendered furniture by adding tile work in poor taste.

An Enriching Factor

At Ramona High School in Riverside, Calif., we have tried to use mosaic tiles as a medium of inter-departmental co-operation. When a student decides to try something in tile, he is sent to the art department for the preliminary planning. The art instructors give the student the necessary advice on color and design and help him create a full scale drawing of the idea. Building the rest of the project is done in the industrial arts rooms. The actual setting of the tile is also done within the industrial arts facilities.

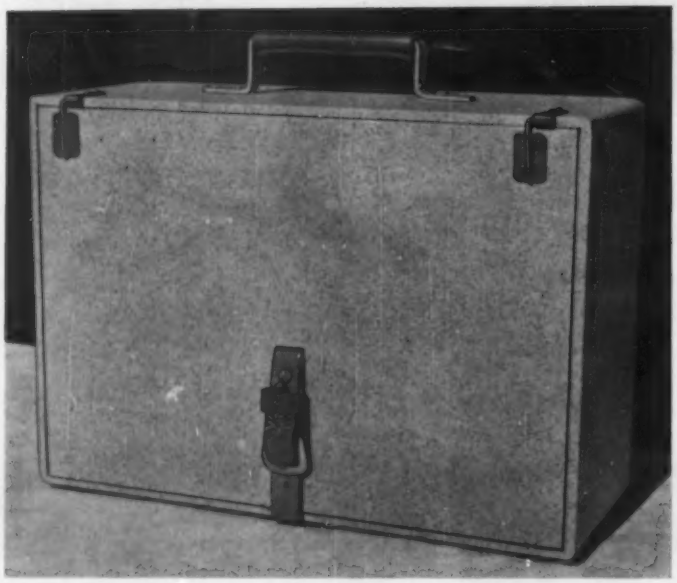
The crossing of departmental lines will always create inconveniences, but these are overshadowed by the worthwhile educational experience for the student. Each department has a distinct function in this learning process. In the art department the student encounters extensive planning and aesthetic design. The industrial arts department can actually relate this artistic idea to industrial methods. In addition to the industrial tools and processes involved in constructing a wood or metal base, various jigs and devices are built to speed up the laying and cementing of tile.

Unifying Learning Fragments

Ceramic mosaic tile, cemented together in an artistic fashion, can do much to cement together the fragments of learning that are too often closed behind departmental doors. ◀

PHOTO CASE

THOMAS NOWACKI
Poland, N. Y., Central School



A durable wood photo case can be easily made to replace the customary leather gadget bag. It has several advantages over its leather counterpart. Besides being less expensive in cost, it affords maximum protection for equipment and individual compartments for all accessories.

The photo case is designed with quick removable cover which makes access to the interior very simple. Accessories can be easily reached without fumbling through all of them just to get at one.

The dimensions of this photo case are good for a twin lens or 35mm. camera. The size of the case can be varied to suit individual equipment. The equipment to be considered for fitting into the case should be: camera, flash gun, flash bracket, light meter, flash bulbs, film, lens brush, flash cord, extra lenses, etc.

The hardware for this case was handmade, but standard hardware could be purchased. Also the type of cover latch could be changed to suit the individual. Hardware from old luggage could be salvaged for use on the photo case.

Procedure

1. Cut out poplar to width and length.
2. Dado the ends of the top and bottom pieces ¼ in. deep by ½ in. wide.
3. Groove one edge of all pieces ¼ by ¼ in. for cover recess.
4. Glue and nail frame together, use ⅞ in.–18 brads.
5. Glue and nail 10 by 14½-in. piece of plywood flush to the outside of the case frame.
6. Glue and nail interior partitions.
7. Set all nails.
8. Round off corners with a file and sandpaper. Break all other edges with sandpaper.
9. Fill nail holes with water putty.
10. Make cover hinges by bending the ⅛ in. diameter rod 90 deg., ⅜ in. from one end. Then braze rod to the ¾ by 1 in. steel plate. Drill two No. 30 holes.
11. Make case hinges by bending the 18 ga. strip around a ⅛ in. diameter rod. Drill two No. 30 holes.
12. Fit cover to recess.
13. Fit hinges to case and cover, drill holes through case and cover with a No.

30 drill. Use 4–40 r.h. machine screws to fasten hinge to cover and case.

14. Drill out and file ⅛ by ¾ in. slot in cover, 5½ in. from hinge side. (note photo of case)

15. Sand case.

16. Apply one coat of white shellac.

17. Sand case lightly with 6/0 sandpaper.

18. Apply one coat of rubber base paint.

19. Apply one coat of "splatter paint."

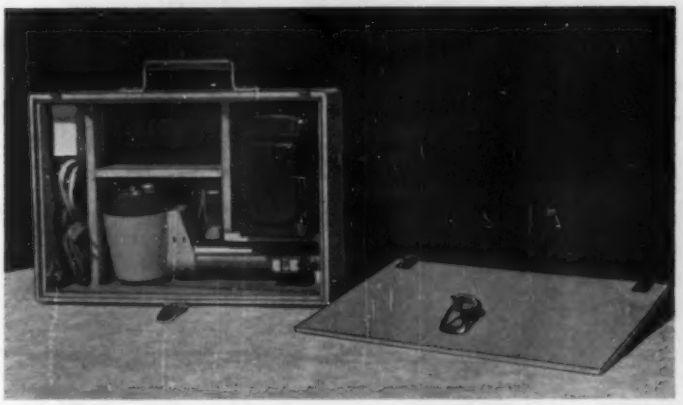
20. Fasten buckle to 4 in. piece of leather and insert it through the slot in the cover. A small piece of leather riveted on the end of the strap prevents it from being pulled through.

21. Fasten 5½ in. strap to the case with two ½ in.–8 r.h. wood screws.

22. Put cover in place and tighten strap, punch holes for the best tightening positions.

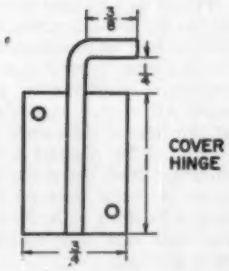
23. Lay out band iron for handle, drill four No. 30 holes. Bend handle to shape. Use 4–40 r.h. machine screws to fasten handle to case. If desired, sew 6 oz. cowhide around handle for a soft grip.

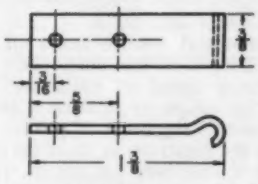
24. Use four rubber headed tacks on the bottom and four on the side opposite the cover. This way the case can be laid down horizontally without scratching the case.

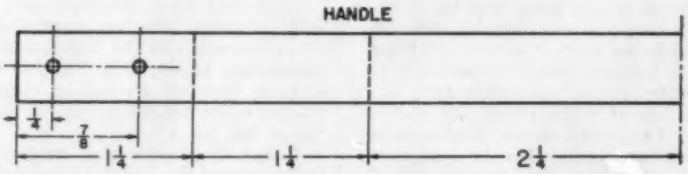


BILL OF MATERIALS

Quan.	*Description*	*Material*	*Size*
2	Top and bottom	Poplar	½ x 5½ x 14½"
2	Ends	Poplar	½ x 5½ x 10 "
1	Back side	Plywood	¼ x 10 x 14½"
1	Cover	Plywood	¼ x 9½ x 14 "
1	Handle	Band iron	⅛ x ½ x 9½"
2	Case hinge	18 ga. steel	½ x 1½"
2	Cover hinge	18 ga. steel	¾ x 1 "
2	Cover hinge	steel welding rod	⅛ x 2 "
1	Cover strap	6 ounce cowhide	¾ x 4 "
1	Case strap	6 ounce cowhide	¾ x 5½"
1	¾" buckle		
8	Rubber headed tacks		
2	½"–8 r.h. wood screws	Fastens case strap	
12	4–40 r.h. machine screws & nuts	Fastens hardware	







NIGHT LIGHT OR TV-LIGHT BOOK ENDS

JOHN S. LORR
Head of Arts and Crafts Department
Fremont High School, Sunnyvale, Calif.

This dual purpose object consists of a rectangular box with horizontal slots cut into each end. Plastic pieces in the form of horses' heads are pushed part way into these slots. The exposed edges of the heads are sanded to produce a rim-lighted effect, which is activated by two, small, 15-watt light bulbs.

Quarter-round wooden strips on top of the box, near the ends, keep the books from sliding off while the "S"-curved horses' necks produce a spring action to hold the books in place.

As to the construction, after the plastic shapes have been cut out of ⅛ in. stock (Plexiglas), sand all edges except the one on the bottom, which should be buffed clear to transmit the light.

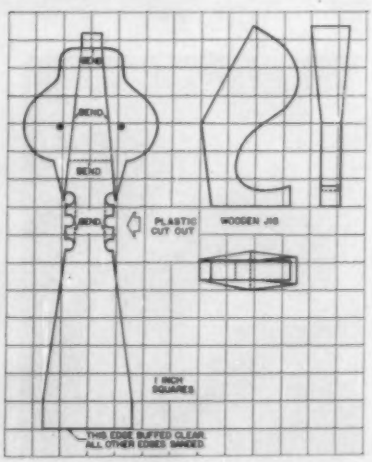
The first plastic horse, with the covering paper removed, should then be heated in an oven or over a hot plate until it becomes limp. It is advisable to use cotton gloves in handling these cut-outs since they get rather hot at this stage. The plastic design is then bent around the wooden jig; the head over the front portion and the neck around the back curve. Fold the facial flaps around the sides. Now hold the plastic horse on the jig until it cools, but do not force it at any time as this may cause it to crack. If certain parts did not shape up properly, reheat that portion over a hot plate while it is still on the jig. Then remove the horse carefully by gently prying it apart.

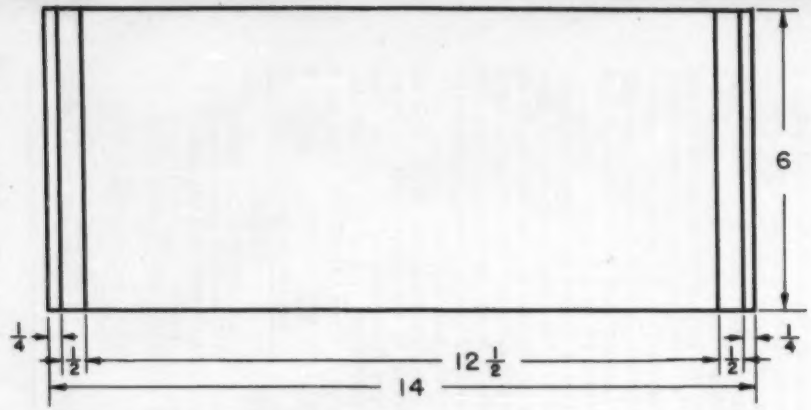
Follow this by spot heating and bending the lip and the mane. With the latter this is best accomplished by pinching the two parts toward each other. Repeat the entire performance with the other head. After that, sand the inside edges of the horses' ears since these sections could not be reached while the pieces were flat. Now insert the bottoms of the necks into the slots on the box. They should be flush with the inside edges of the slots and snug enough to prevent light leakage.

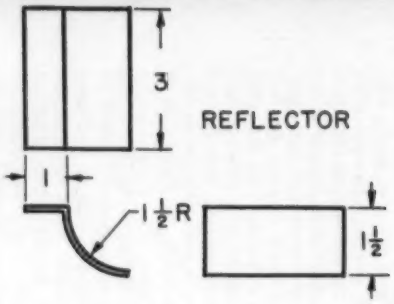
Candelabra bases are used with the light bulbs and reflectors, made from a tin can, concentrate the illumination on the exposed plastic strip. The flat ends of these reflectors are held in place by wooden strips wedged against the inside top of the box.

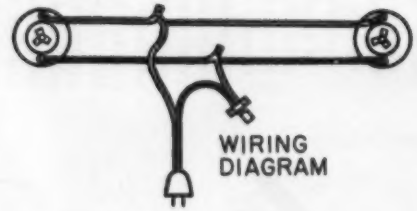
A sheet of asbestos ⅛ in. thick forms the bottom of the box. It is fastened by four small screws. Rubber covered tacks are pushed into the base to form the feet.

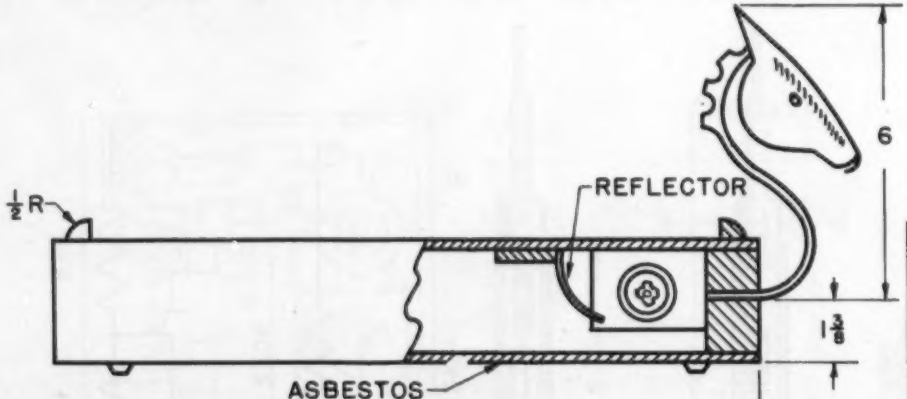
Ventilation is provided by four small holes in the back of the box. Since they face the wall, the small amount of light that escapes cannot be noticed. A canopy switch is also located in the rear. The box may be stained or painted any color which is harmonious with its surroundings. If you plan to use fewer books for display, the box may be cut down in length.

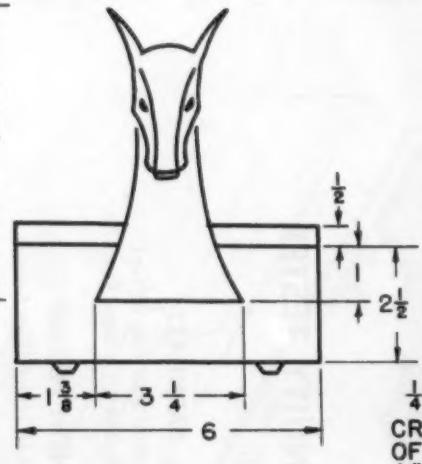


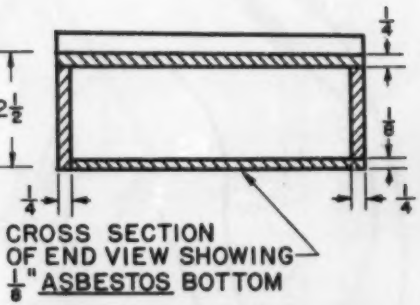


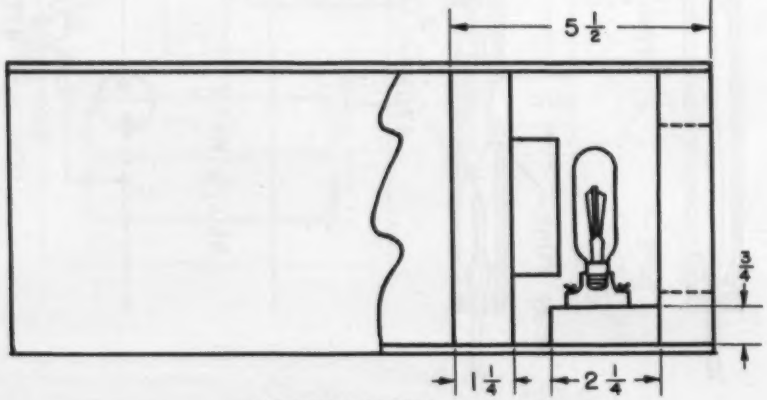




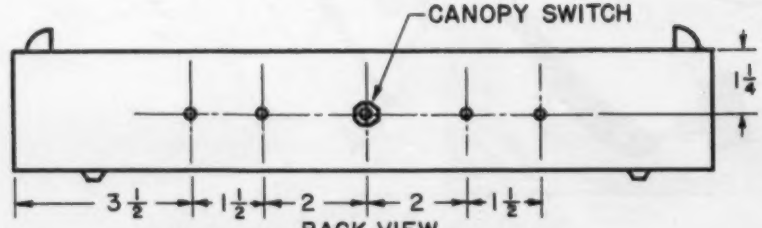




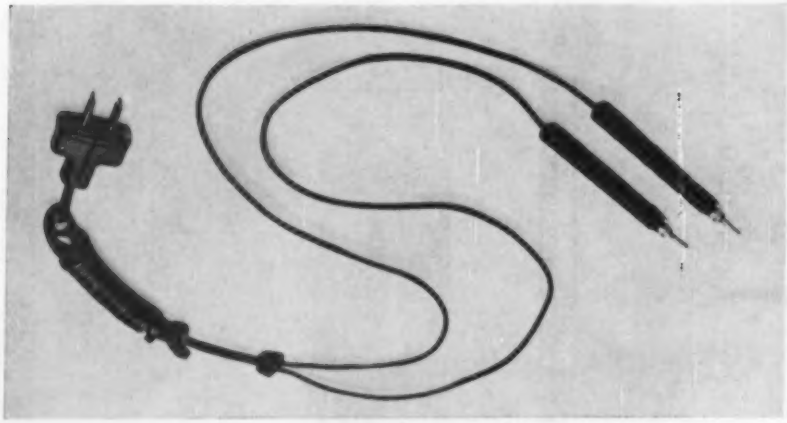




BOTTOM VIEW
WITH 1/2 ASBESTOS COVER REMOVED



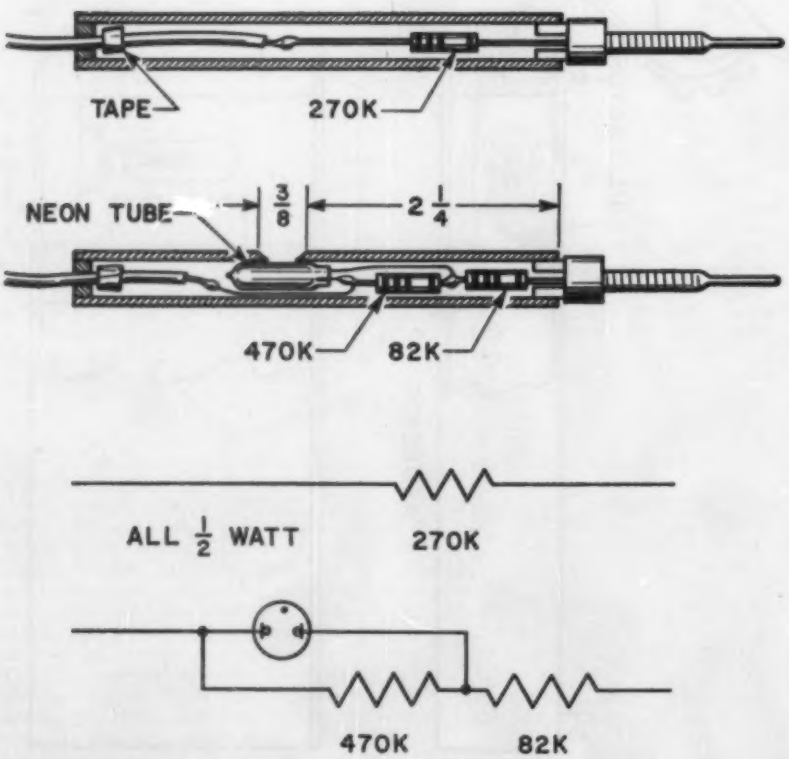
BACK VIEW
SHOWING AIR VENTS 1/4" IN DIAMETER



CONTINUITY TESTER

E. L. BARNHART
Head, Industrial Arts Department
Kansas State Teachers College, Emporia

KENNETH FELTNER
South Riverside Junior High School
Wichita, Kans.



A continuity tester has many uses in testing electrical circuits and components. Commercially available models usually require one or more dry cells to operate them, however, and are useful only on very low resistance circuits, because of the low voltage available and the relatively high current needed to operate the incandescent bulb in the tester. Electrical textbooks and magazines frequently suggest construction of a continuity tester using a regular 117-volt a.c. outlet as the source of power, with an ordinary light bulb of small size in series with the line and the test prods. The authors believe this arrangement, while useful, should not be used or built as a project in the school shop, because it is a potentially dangerous device. It is capable of causing injury or even death if the user comes in contact with the probe that is not in series with the test light when the plug is inserted into the wall outlet so that the end attached to this probe is connected to the "hot" side of the circuit.

The project described in this article was developed in a graduate course to be used as a project in a beginning course in electricity, and to overcome the objections to the usual tester as cited previously. The tester needs no battery, but can be plugged into any 117-volt wall outlet. It is completely harmless, as both prods can be held in the hand without a shock, and there is likewise no chance of a dangerous shock (40 volts maximum) if the user becomes grounded while in contact with either prod. The voltage across the types is high enough (20 volts) to operate on a circuit having as much as 210,000 ohms resistance, which will handle all ordinary circuits. The current required to operate the bulb is so low (less than 1 milliampere) that there is practically no heating effect, and no appreciable inductive reactance developed in the current to be tested. It must be remembered, however, that the tester will indicate continuity if there is more than .002 mfd. capacitance in the circuit, if it is powered by an a.c. source.

One of the test prods should be modified by filing a small round or oval opening in the side of the fiber handle, to provide a window for viewing the neon bulb. It is also necessary to ream this same fiber tube to permit installation of the neon bulb and wire.

The resistors should be as close as possible to the values listed, to insure proper functioning of the tester. This is particularly true of the 470,000 ohm resistor, which should not have more than 5 per cent tolerance.

BILL OF MATERIALS

Quan.	*Material*
1	Attachment Plug Cap, Male
3–6 ft.	POSJ or POT 2 wire lamp cord
1	82,000 ohm, ½ watt, carbon resistor
1	270,000 ohm, ½ watt, carbon resistor
1	470,000 ohm, ½ watt, carbon resistor
1	NE-2 Neon bulb
2	Type 323 test prod (Allied Radio No. 42N259)

TWO-TRANSISTOR ETCHED CIRCUIT RECEIVER

REX MILLER
Associate Professor of Industrial Arts
New York State University, Buffalo

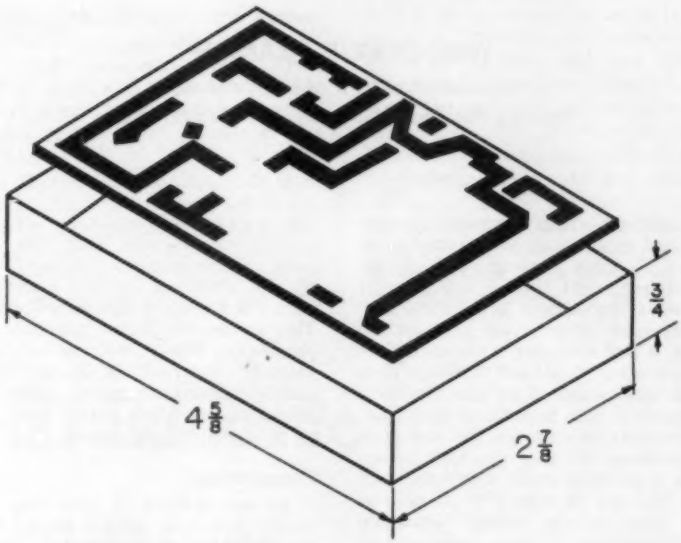
ALAN W. GRACIE
Sayville Junior High School
Sayville, L. I., N. Y.

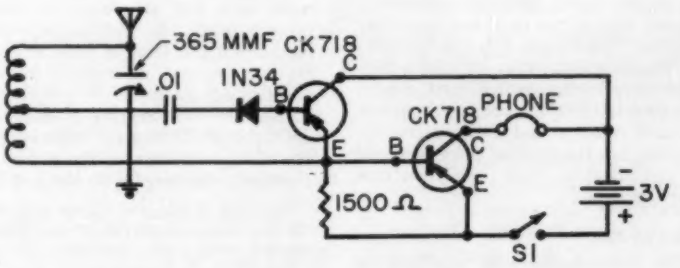
The transfer resistor (the transistor) had added much to the realm of things to be learned by modern youth since its discovery on July 1, 1948. The industrial arts present an ideal place for furnishing information and work related to transistors and etched circuits. The everyday use of printed circuits or etched circuits make it necessary for the student of today to learn more about physics and chemistry. But this instruction should not stop there for the industrial arts department in a school offers practical applications for the student to work with in his class or shop.

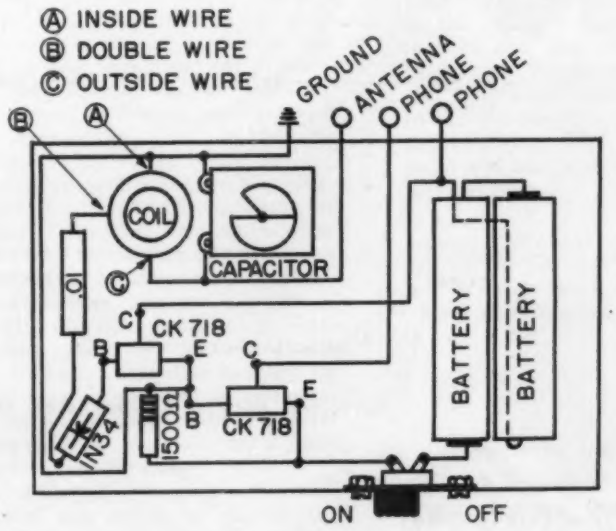
A printed circuit board eliminates the confusion of wires and adds experience for the student. Most printed circuit experience is on the repair side, but designing and etching a complete circuit presents a better understanding of printed circuits. Acid resistant asphalt-base paint is used with a small brush to paint the circuit on the copper-clad before it is etched in ferric-chloride. The ferric-chloride can be obtained from any high school chemistry department in powdered form and mixed in boiling water [1 gal. of boiling water to 13 oz. of ferric chloride, plus one ounce or tablespoon of sodium chloride (table salt)] to form a solution for etching. The solution does not damage the skin tissue, but will stain nails and skin, as well as clothing. The solution should be mixed and kept in a *glass* container. It can be stored in a colored jar or jug after use for future etching.

Use a small (37-watt) soldering iron for attaching the components to the etched board. Do not overheat the connections or the copper will lift up from the board and ruin the process as well as the connections.

Transistors are now available in over 200 diffcrent types each with special characteristics. A handy reference for transistors and transistor circuits is: *The General Electric Transistor Handbook*, available at most radio houses for 50 cents.







Bill of Materials

Variable capacitor, tuning, 365 mmf.
Crystal diode, IN-34A
Switch, single pole, single throw, sliding contact
2 Pen-lite cells
Transistors, CK-718, two, or equivalent
Resistor, 1500 ohms, ½ watt or smaller
Broadcast coil or Miller Loop No. 6300
Tuning knob
Alligator clip for antenna wire
Ear phone or headset
Plastic box for mounting, ¾ by 2⅞ by 4⅝ in.

ELECTRICAL KITS FOR JUNIOR HIGH

WALDEMAR E. KLAMMER
Assistant Professor of Industrial Arts
Western Michigan University, Kalamazoo, Mich.

Teaching electricity properly requires practical applications of the theory discussed in class. Among other things, experiments, job sheets, and projects can serve this purpose in industrial arts. A drawback of electrical projects too often is that excessive mechanical time must be spent to achieve minimum electrical applications. Kits can effectively increase the ratio in favor of electricity.

Obviously kits are not the answer to all problems but they can have advantages if properly used. Relatively complex kits can be assembled by persons who have only a limited mechanical background and a basic knowledge of soldering. Many companies have the procedures so simplified that satisfactory results can be obtained without the slightest idea of the electrical principles involved. These same kits can be effective teaching aids. Preview and follow up are very important. Electrical fundamentals related to the project should be discussed prior to and during assembly. Checking out the finished project should be co-ordinated with the electrical theory involved.

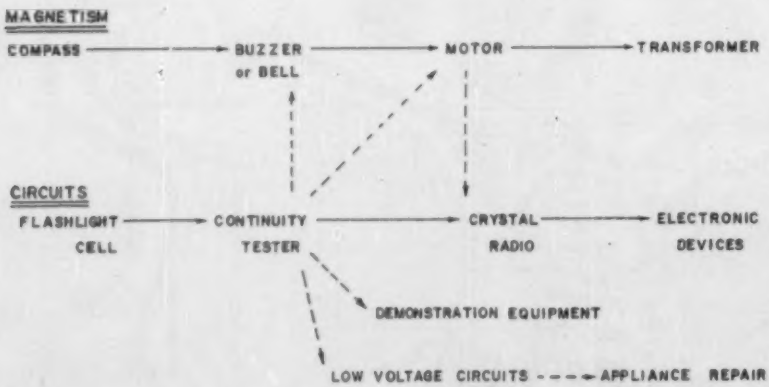
Types of Kits

Kits are commercially available or they may be made up by the instructor to fit a specific need. They may range from a simple magnetic compass to complicated electronic circuits. Prices vary from a few cents to hundreds of dollars. This article will discuss primarily inexpensive kits which are simple and fundamentally electrical in nature — those readily adapted for use in junior high school classes where pupils have little or no electrical background.

Presentation

An easy method of presenting a kit to the class is by using a display board showing the individual parts as well as a completed model.[1] This not only helps the pupil visualize the parts he is to work with but also how the finished project looks. An explanation of the mechanical problems in constructing the kit is necessary but equally important are reading assignments and class discussions of the electrical principles that are involved. During and especially after assembly more detailed discussion make electricity meaningful to the pupil.

[1]Klammer, Waldemar E., and Williams, Thomas, "Display Panels for Electrical Project Kits," INDUSTRIAL ARTS AND VOCATIONAL EDUCATION, (Feb., 1960), 33.



Continuity of Electrical Theory

Continuity of Theory

A suggested means of using simple kits to enhance the discussion of principles of electricity and at the same time keep the theory organized as shown by the diagram.

1. *MAGNETISM.* A series of projects related to magnetism can begin with a compass. Associating this with permanent magnets one can show processes of magnetizing, demagnetizing, and reversing of polarity as well as a discussion of its relationship to the earth's magnetic field. A natural means of leading into electromagnetism may be to build buzzers, bells, and electric motors. Transformer theory can be developed around a commercially available kit which has the laminations all cut and the primary coil wound. Winding the secondary coil to obtain the desired output is explained in the instruction sheet which comes with the kit.

2. *CIRCUITS.* A sequence of projects on electrical circuits can logically begin with a source of power. For this a kit is available for building flashlight cells. An instruction booklet comes with each cell but for best results it must be supplemented by class discussion. The function of each of the materials to be used should be explained. A demonstration by the teacher will clear up any possible construction problems. A means of checking the finished cells should be provided. The whole process can nicely be tied in with the general discussion of chemical effects of electricity.

A continuity tester made up of a few parts such as a bulb, some wires, and a plastic vial serves as a good use for the single flashlight cell. (A metal capped plastic vial 1¼ by 3 in. is available into which the "D" size cell fits nicely with about one half inch end clearance.) From this project there are several possible suggested procedures. One can go directly to crystal sets and more complicated electronic kits or one can, as the diagram indicates, make use of the circuits involved in the buzzer and motor kits. A practical use of the continuity tester is in tracing through low voltage circuits and checking for opens, shorts, or grounds in appliance repair work.

In Summary

One method of reducing the mechanical time spent on electrical projects is to use kits, whether teacher developed or purchased from commercial distributers. They can more effectively enrich the electrical program if they are integrated directly into the discussion of the basic fundamentals. Precaution must be taken to prevent this becoming a mere mechanical process. A means of gaining continuity of the electrical theory is to use a sequence of electrical project kits as well as demonstrations, low voltage wiring job plans, appliance repairs, and other practical applications of the principles of electricity.

Audio-Visuals in Industrial Education

G. RICHARD LAWSON

▶ The why, what, how, and wherefore of using audio-visual equipment and materials in the field —

Why: The industrial educator will have a better chance of impressing students' minds with new concepts when he appeals to as many senses as possible. Audio-visual aids can be used to appeal to sight, sounds, or a combination to improve learning by the students.

Audio-visual aids are used to increase understanding, to explain a principle or abstract idea, to illustrate relationships, to show order and sequence of procedure, to demonstrate standards of workmanship, and to show materials of construction.

An effective aid is one that is designed to help clarify a teacher's verbal explanation of a complicated principle or theory. Therefore, it can be said that the most useful and effective audio-visual teaching aids are those conceived and created for a teacher's particular needs.

Teaching aids appeal to the senses to make a more vivid and, therefore, more easily recalled impression. Some teaching aids appeal more strongly to one than another. For instance, sight: a graph is a visual aid. Other aids appeal to the sense of hearing: a tape recording is an aural teaching aid. Still others appeal to a combination of senses: a movie is an audio-visual aid; a model is a visual-tactile aid — it can be seen and touched. Since a majority of teaching devices are audio-visual, this term, in practical application, has superseded the other specific terms and has come to be accepted for the group.

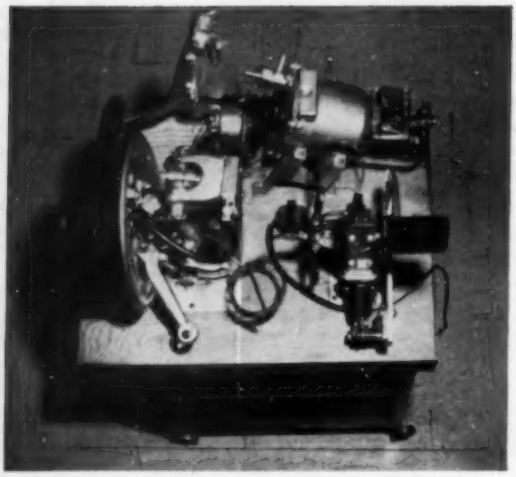
Learning results from what is seen, heard, felt, or touched through the senses. The teacher who exploits these avenues of learning the fullest knows a great degree of success in getting students to learn than the one who is satisfied with only an auditory or visual experience, such as a lecture or a reading assignment. It is often necessary for each sense to be exposed to various approaches to material in order to overcome difficulties in learning and to make learning more permanent.

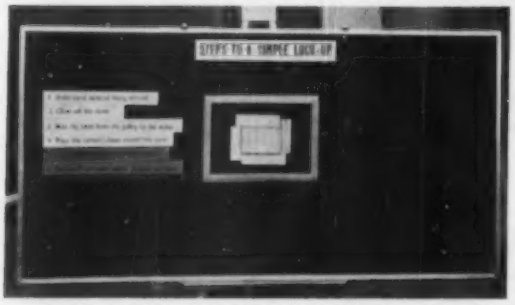
If a concept or a procedure is complicated and difficult to explain, the more avenues used to reach the student, the more likely he is to learn. Therefore, two or three senses appealed to in several different ways will more likely impress the concept or procedure on the student's mind.

For example, a graphic arts or printing teacher explains the steps to a simple lockup for the platen press. The students see an actual demonstration of a lockup in the shop. The teacher then follows up the demonstration by returning to a classroom or relatively quiet corner of the shop and goes through the process, step-by-step, using a flannel board demonstration of flannel-backed balsa wood with the steps printed on flannel-backed cardboard. The student hears the steps; he also sees them on the flannel board. He sees an actual demonstration in the shop amid the noise and confusion in which he will eventually work. Later, he sees the same demonstration slowly, out of the shop atmosphere. He can become familiar with the feel of the quoins and the chase. He can ask questions. After all these avenues of learning have been approached, surely he is better equipped to perform the procedure being taught than if he merely sees a demonstration and hears an explanation.

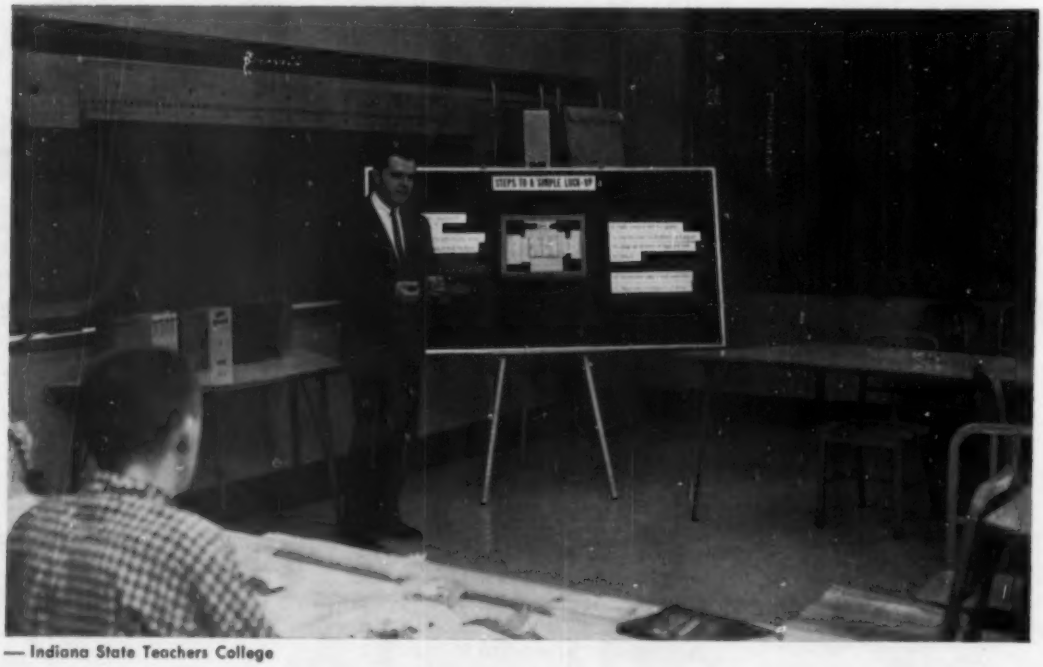
What: A-V materials are many and can serve varied purposes. The bulletin and chalkboards, and the flannelboard can help demonstrate. A display board, exhibit cases, and a mock-up are in the "display family," as are models and flip charts. Flash cards and "teaching machines" are "questioner" aids. Appealing to the two senses are films, filmstrips, slides, TV, etc., while radio and the tape recorder impress hearing.

Mr. Lawson is in the division of graphic arts, Industrial Education Department, Indiana State Teachers College, Terre Haute.





Audio-visuals in action: (upper, left) a working display board — run by "Erector" set motors encased on back of board; (left and below) two views of using a flannel board demonstration — with actual sizes and colors of materials; (above) a mock-up of a hydraulic and power brakes assembly — with a working valve.



— Indiana State Teachers College

Teaching materials or aids are of infinite variety for widely applicable uses. Next to the textbook, the chalkboard is probably the most universally used visual aid. What teacher doesn't jot important information or sketch an illustration on the board many times a day. And the chalkboard's utilization does not end with those teachers who are fair to good "sketchers"; an inexpensive tracing wheel perforates cardboard or heavy paper with a traced dotted outline of a picture easily transferred onto the board with a dusting bag transforming the most unartistic teacher into a free-hand artist by simply following the dots. Templates, which are accurate wood or metal patterns, are of great use when a basic outline is drawn repeatedly, such as a gear or portion of a gear showing several gear teeth.

Bulletin boards are only as valuable and informative as what is displayed on them. Illustrations — drawn, traced, printed, or cut out of books, newspapers, or magazines — can be used in a multitude of ways. A bulletin board display which follows a central theme can be infinitely more effective than just a random collection of odds and ends of information. A pictorial set of rules to follow when operating a machine is more vivid than words. Photographs, cartoons, and diagrams add variety and interest to learning. A cartooned safety warning concerning the operation of a shaper or a lathe is effective and easily accepted. Different kinds of charts, graphs, and posters emphasize a particular idea, compare two or more things, explain relationships, show development or change and structure, depict plans and patterns, etc. A bulletin board display achieves effectiveness when it enriches the classwork, stimulates curiosity, motivates action, and informs.

Another type of board demonstration is the flannel or felt board demonstration. The felt board, however, adds a new dimension to the learning process. The appeal of visual and manipulative material is strong and vivid. The flexibility of this medium of display is an important asset to the teacher. Its convenience and simplicity are also attractive. A board covered with a felt-like material is the main piece of equipment. Objects to be used have felt, flannel, or some other sensitive backing which enables them to stick to the board through the principle of friction. This spectacle of pressing meaningful materials, such as the lockup display mentioned previously, against a surface and seeing them stay arouses interest and gains attention. Many displays not ordinarily thought of as adaptable to flannel board use are possible. A display of sheet-metal joints made from felt-backed balsa wood painted with metallic paint for three-dimensional realism is another example.

When it is desirable or necessary to find some way to illustrate certain mechanisms such as different types of gears or the operation of the three types of letterpresses, display boards are called for. They are most useful in industrial education because of their adaptability and versatility. A display of broken tools is an impressive lesson against improper use of tools. A display may show a procedure like countersinking a drilled hole or the relationship of co-ordinate parts of, say, a drill press or a working transmission. A materials display, an excellent aid to learning, might consist of the types of building hardware in a woodworking shop or the various types of screws, bolts, nuts, and bits used in the machine shop in the metal trades.

Display or exhibit cases are most often used for exhibiting student projects and setting standards of workmanship. The potential of industrial materials for display should not be overlooked. One precaution to be remembered is that change is vital to effectiveness in using display materials.

Also in the "display family" is the mock-up, consisting of a mechanism such as an automobile electric system, or brake assembly removed from the larger unit of which it is a part. This affords the opportunity of viewing the mechanism and its co-ordinating parts from one position.

Mock-ups lead to models, of which there are several kinds. The cross-section or cutaway models are often necessary to show "how something works," such as a cross section of a portion of a piece of equipment or motor or a cutaway of, for instance, a hydra-matic transmission. A working model of a mechanism shows how gears mesh properly or the action of a cylindrical cam and lever. Reduced models and scale models are convenient to show large pieces or portions of equipment or perhaps the result of projects, such as building construction models of various phases of construction, in the classroom or shop. Conversely, the enlarged model is helpful when teaching involves relatively small objects or devices, such as pieces of type, screws, wood joints, sheet-metal edges or joints, which can better be seen and their action or use understood through enlargement.

As is often the case, a teacher finds himself repeatedly explaining a principle or concept with benefit of also repeated jottings and sketchings. To fill this specific need, flip charts and cloth charts are convenient, extremely useful, and quite easy to make. They can be used to show an idea or difficult point, such as the difference between the teeth in the cross-cut and the rip saw. Important facts which must be referred to again and again can be placed on a light colored window shade to make an excellent rolled chart which can be easily stored yet remain handy. A set of rules or steps in a procedure are particularly adaptable to rolled charts. The process of recentering the start of a drilled hole according to proof marks is an example of this type of chart. A process or explanation which entails repeated enumeration or sketching and labeling can be prepared on a flip chart or other charts *once* and take an immense burden from the teacher's already overburdened shoulders, simultaneously making his teaching more effective and lasting.

Flash cards have been well used in elementary school for some time. They also have a place in industrial education, in such cases as learning micrometer readings, screw and nail sizes, drill sizes, electrical and other symbols, etc. The material may be printed on large cards and flashed by hand, viewed from an opaque projector, or even from slides flashed on a screen at controlled intervals.

Flash cards are also superior testing devices for certain materials. Another learning-testing device which is highly adaptable to most teaching material is the electric questioner. This relatively simple aid asks such questions as "Can you name . . . these types of gears?" or ". . . mechanical drawing symbols?" The question "Can you name . . ." is permanently on the board while the rest of the statement can be quickly and easily changed to suit the occasion. A list of parts or symbols is accompanied by scrambled pictures or words which are simply connected electrically on the back. Buzzers, bells, or lights signal correct answers when properly touched.

The electric questioner is an audio-visual aid just as truly as is the motion picture. Motion pictures or movies provide many vicarious experiences which are worthwhile, yet difficult to experience firsthand. Actual field trips into industry are invaluable, although making many trips is impossible. Movies bring industry into the classroom and shop. Students can look over a woodworker's shoulder and watch a delicate turn made more closely and in clearer detail than if they were present in the

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factory. Whereas movies have an aural explanation accompanying the visual sensation, the slide has the different yet distinctive advantage of singling out one frame or picture for minute examination. A motor in motion shows one thing while a close-up still of an armature shows another aspect. Filmstrips or slide films, both with and without sound, are simple to use, yet versatile. A series of slide film on "safe practices in woodworking" is an example of a useful and valuable application of slide film as a teaching aid.

The visual slide leads to its aural counterpart, the tape or wire recorder, probably the most overlooked aid to industrial education. Its value depends entirely on the teacher's exploitation of its particular characteristics. An example of its possible use would be a pre-recorded explanation, lecture, or test which could be run and re-run for a group of students which the teacher or a student demonstrates or even, when teaching two or more classes simultaneously, the teacher is in another part of the shop for a short time with a different group.

Although the tape or wire recorder has a definite place in teaching, its uses are limited. The possibilities for using the opaque projector, on the other hand, are unlimited. It can project *any* kind of nontransparent, flat-surfaced matter onto a screen, blackboard, or chart for tracing — materials from textbooks, reference books, pictures, diagrams, charts, even such things as a milling cutter, gear, tool, gauge, micrometer, light meter, etc. An unending list of things may be projected in their natural color but greatly enlarged. Its simple operation plus its countless possibilities for use make the opaque projector invaluable for the teacher.

Another type of projector, the overhead projector, has the advantage of not needing complete darkening of the room for its use. This machine permits the teacher to face his class while he talks and writes, or points to details on the transparency which is projected above and behind him. This student-teacher relationship is a valuable asset far outweighing the trouble of preparing transparencies. In teaching drawing for instance, as well as other subjects, the overhead projector fills a definite need.

How: Classrooms and shops should have access to and room to utilize basic equipment; electrical outlets and dimming devices should be available; and display areas should be defined.

Access is the key word, and *facilities to utilize* is the key phrase in planning for audio-visual aids in industrial education. Classrooms and shops should have access to and room to utilize basic equipment such as the various projectors — movie, slide, film, opaque, and overhead — as well as screens for projection. A tape or wire recorder is also desirable. An overhead projector can be made in the shop — shop-made mechanisms having the advantages of being both simple and inexpensive.

The area used for classes should have sufficient electrical outlets to permit utilization of equipment at the best location for specific lessons so that continuity is not broken. Also, the classroom or area should be so arranged that it can be dimmed and noisy distractions removed as much as possible for showing movies, slides, and films. This class area should have chalkboards, either mobile, stationary, or both. Walls should be usable for displaying flannel boards, charts, graphs, illustrations, pictures, and bulletin boards. Simple wooden racks and cabinets can be made for storing charts, graphs, and other materials which must be protected in some way yet must be kept handy. A lightweight easel for flip charts or felt board, made to fold when not in use, is essential equipment in class areas. A table for displaying models, mock-ups, exhibits, and displays is also necessary.

***Wherefore:* Audio-visuals represent one direct and valuable approach to better courses in industrial education.**

In every area of industrial arts there are concepts which are difficult for the student to grasp, mechanisms which are not easily explainable, principles which are hard to understand. These concepts, mechanical relationships, and principles must be presented and re-presented by a variety of meaningful avenues. The teacher must decide the best *ways* of presentation and then select the *means* most readily adaptable to the specifics being taught.

The choice of the aids used in teaching depends upon the teacher — his ingenuity, common sense, alertness. Far less importance should be placed on cost. The basic equipment — projectors, screens, recorders — are nearly always available to all departments of a school to use on request. Many simple mechanisms, pieces of equipment, models, displays, exhibits, charts, and other materials can be made in the shop by teachers and students. Free aids are available from numerous organizations, compiled and catalogued in most educational libraries. A small budget can render large dividends in good teaching.

Access and utilization are the keys to improving teaching through audio-visual aids. The best medium must be created and used by the teacher to open the ears and eyes which are the doors to the student's mind. ◀

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GUIDANCE AND INDUSTRIAL EDUCATION

(Concluded from page 14)

Guidance Role of the Industrial Educator

In any school, the industrial educator plays a unique role as a resource person. Industry, and the jobs of industry, change so rapidly that no one can be expected to be well informed on all aspects of the total picture. But through basic training in those skills and knowledge upon which industry is built, industrial educators are in a position to be the best informed resource person in school. We hear that there may be up to say 40,000 different jobs into which individuals may enter today. We hear, also, that possibly 75 per cent of the jobs did not exist two or three generations ago. We hear that research will bring new jobs, render old jobs obsolete, and change the emphasis upon and meaning of existing jobs. Teachers cannot keep up with all of this, of course, but they can be more nearly up to date than anyone else in school. They are in a position to understand, and to impart an understanding of, the changing mode of life which is peculiar to our American industrial system.

The training and interests, the very work of the I-E teacher in a community position, as well as a school position, which is unique. More and more, the industries of the community depend upon the industrial educator to discover and develop those skills which can make industry possible. More and more, he has access to places, to individuals, to materials which can help develop the individual skilled worker and technician of the future. More and more, his judgment is called into the total program of industry-centered life. And as research changes jobs, he has a greater burden and greater opportunity to assist in re-evaluating and re-training every individual. In industry's rapid change today, the guidance worker would be lost without the trained industrial educator as a resource person, to help him provide current and meaningful guidance for pupils, and for former pupils.

An Added Opportunity

The industrial educator can and must co-operate with the school guidance program in the sense that every teacher must provide such co-operation. He can profit from the skills and competencies of the trained counselor. But the very nature of our society gives the industrial educator an added duty — and an added opportunity.

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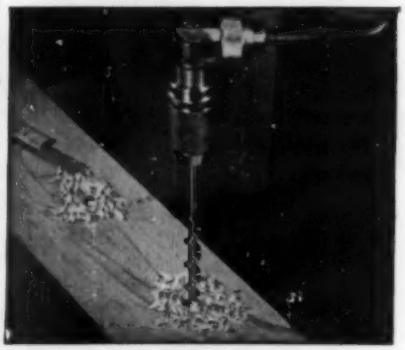

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WHICH WOOD FINISH IS BEST?

A woodworking student, who has spent many hours constructing a very acceptable project, detracts frequently from the appearance, and, consequently, the utilitarian value of that project by using poor judgment in his choice of finishing materials. In recent years, following the introduction of the rub-on type of quick drying finish, there has been much disagreement among teachers of industrial education about which type of finish best fits the needs of the school shop. It is of little value to heed the manufacturers' claims of the superiority of their products in that often little consideration is given to their adaptation to specific wood finishing applications.

This is a report of a study conducted to determine the merits of the available wood finishes, taking into consideration such factors as: (1) resistance to water, salt water, alcohol, tea, coffee, and hot water; (2) durability in regard to film toughness and wearing qualities; (3) ease of application, and (4) dust-free drying time.

In order to determine relative qualities of the various types of wood finishes and their suitability for specific finishing situations, the author has based this experiment upon ten controlled tests. All of the finishes were applied by the manufacturers' recommended methods. When a brush was specified, that method, as well as a cloth, was used; conversely, when a cloth was specified, the brush method was also tested. All of the finishes were applied to wood samples 3/8 by 2 by 4 in. which had been kiln dried to approximately 5 per cent moisture content. The room temperature at time of application was 70 deg. to 75 deg.

Experimental Methods Used in the Liquid Tests

Method of testing. Exactly two drops of liquid was applied to each finish test sample with a medicine dropper, taking great care not to break the surface tension of the globule.

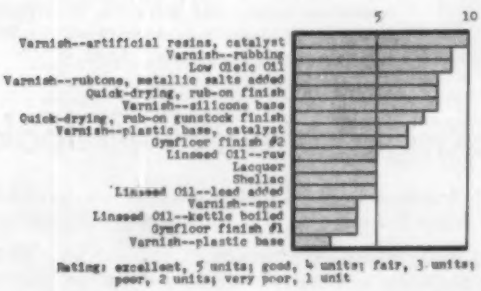
Testing procedure. The liquid globule was allowed to remain on the surface of the finish for 24 hours. At the end of that time all the liquid had either been absorbed by the finish or had evaporated. All surface stains which had been deposited by the liquids were then removed with water and a soft cloth, so as to facilitate close observation of the test results.

Experimental Methods Used in the Film Test

Method of testing. In order to determine the film toughness of the finishes, which is very important when they are applied to household furniture, a testing device was constructed which would either cut through the surface of the finish or slide over it as the case may be.

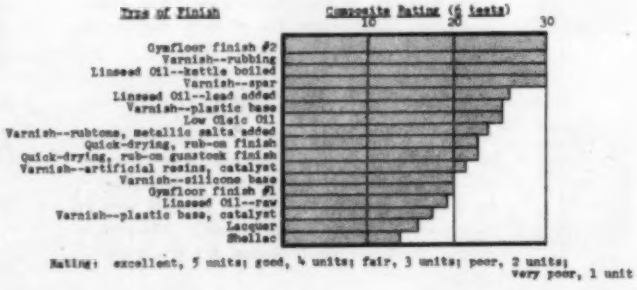
Testing procedure. The testing device consisted of a base and a hinged arm with a stylus attached to the free end. The sample block of wood was then placed upon the base and the stylus, with the weight of the arm bearing downward upon it, was placed on the finished surface of the block. When the block was drawn along the base, it was discovered that the weight of the arm was insufficient to affect the finished surface. Consequently, a small magnet was attached to the arm and steel weights were added to the magnet until the weight was sufficient enough to cause the softer films to be scratched

DURABILITY OF FINISHES



Rating: excellent, 5 units; good, 4 units; fair, 3 units; poor, 2 units; very poor, 1 unit

RESISTANCE OF FINISHES TO LIQUIDS



Rating: excellent, 5 units; good, 4 units; fair, 3 units; poor, 2 units; very poor, 1 unit

TABULATION AND RATING CHART OF FINISHES

TYPE OF FINISH	Resistance to: SALT WATER	TEA 70° F.	ALCOHOL	HOT WATER 150° F.	WATER 70° F.	COFFEE 70° F.	Durability: FILM TOUGHNESS (Scratch Test)	WEARING QUALITY (Emery Buffing Test)	RECOMMENDED METHOD OF APPLYING	DUST-FREE DRYING TIME	APPEARANCE
Varnish--artificial resins, catalyst	fair	fair	excl.	good	fair	fair	excl.	excl.	cloth or brush	fair	excl.
Varnish--rubbing	excl.	excl.	excl.	excl.	excl.	excl.	excl.	good	brush	good	excl.
Varnish--silicone base	fair	fair	excl.	fair	fair	fair	good	good	cloth	excl.	excl.
Varnish--rubtone, metallic salts added	good	good	excl.	fair	good	fair	good	good	brush or cloth	good	good
Varnish--plastic base, catalyst	good	fair	fair	poor	fair	fair	fair	fair	brush or cloth	excl.	excl.
Varnish--spar	excl.	excl.	excl.	excl.	excl.	excl.	fair	very poor	brush	poor	poor
Varnish--plastic base	good	good	excl.	good	good	good	very poor	very poor	cloth or brush	fair	fair
Low Oleic Oil	good	good	excl.	good	good	good	excl.	good	brush or cloth	excl.	excl.
Linseed Oil--raw	poor	good	good	poor	fair	good	very poor	good	cloth or brush	poor	poor
Linseed Oil--lead added	good	excl.	excl.	good	good	good	very poor	good	cloth	poor	fair
Linseed Oil--kettle boiled	excl.	excl.	excl.	excl.	excl.	excl.	very poor	fair	cloth	fair	fair
Gymfloor finish #1	good	fair	good	fair	fair	fair	poor	poor	cloth or brush	good	good
Gymfloor finish #2	excl.	excl.	excl.	excl.	excl.	excl.	good	poor	cloth or brush	good	good
Quick-drying, rub-on finish	fair	fair	good	good	good	good	excl.	good	cloth	excl.	good
Quick-drying, rub-on gunstock finish	fair	fair	good	good	good	good	poor	excl.	cloth	excl.	good
Lacquer	poor	fair	fair	poor	fair	fair	poor	fair	brush or spray	excl.	good
Shellac	poor	poor	very poor	good	fair	very poor	poor	fair	brush	excl.	fair

and yet not damage the film of a finish which the author knew from experience to be very tough.

Experimental Methods Used in the Wear Test

Method of testing. A cloth buffing wheel, loaded with emery powder, was used to test the wearing qualities of the various finishes. The finish that was being tested was brought into contact with the revolving buffing wheel with an equal amount of pressure applied to each test during an equal amount of time.

Testing procedure. A wooden jig was constructed in order that each finish sample would contact the periphery of the wheel in exactly the same manner. After further experimentation it was discovered that a time factor of 15 seconds was sufficient to cause a complete breakdown of one finish and cause only minor damage to the most durable finish. Consequently, each test sample was run through for a period of 15 seconds and the resulting damage was then tabulated.

Results of the Experiment

The experimental findings were compiled and tabulated, listing each finish which was tested and rating each one by comparing it with the other finishes. The rating scale consisted of five ratings: (1) excellent, (2) good, (3) fair, (4) poor, and (5) very poor. This test rating was given to each finish for each test to which it was subjected. The test data were then collected in the form of the accompanying bar graphs and rating chart.

Summary and Conclusions

According to the findings of this experiment, it is evident that the short-oil type of resin varnish is still the most desirable finish available for household furniture. The long-oil varnish (*spar varnish*) is not intended for use on furniture; consequently, the soft film, because of the oil content, will scratch easily, will not hold a gloss, and will become tacky during hot weather and high humidity. This type of finish must be used out-of-doors because, being exposed to the elements, it must of necessity expand and contract during weather and seasonal changes. Although one will note by observing the rating chart that the spar varnish passed the liquid tests with an excellent rating (which was to be expected), its failure to pass the scratch and wear tests makes it unsuitable as a furniture finish.

Shellac is a very good sealer when used under a varnish, but it has very few qualities that will recommend it for a final furniture finish.

The *rub-tone varnish* has a short-oil base with metallic salts added to give the finish a hand-rubbed effect; it has a very pleasing appearance.

The *plastic-base finishes* are of little value as furniture finishes.

Lacquers are of very little value as furniture finishes in the hands of the inexperienced in that their compositions are so varied and specialized that their use should not be attempted in the school shop.

Linseed oil, as a finish, is undesirable for furniture use or gunstocks, in that it will allow moisture to enter the wood. It is, also, very unstable when exposed to heat, being worse in this respect than a long-oil varnish.

Kettle-boiled and boiled (leaded) linseed oils are merely specially-treated linseed oil which dry more quickly.

Two brands of *gymfloor finishes* were included in the experiment because a number of woodshop instructors informed the author that they had been using the gymfloor finishes and had found them to be very satisfactory. They are good, all-purpose floor and furniture finishes.

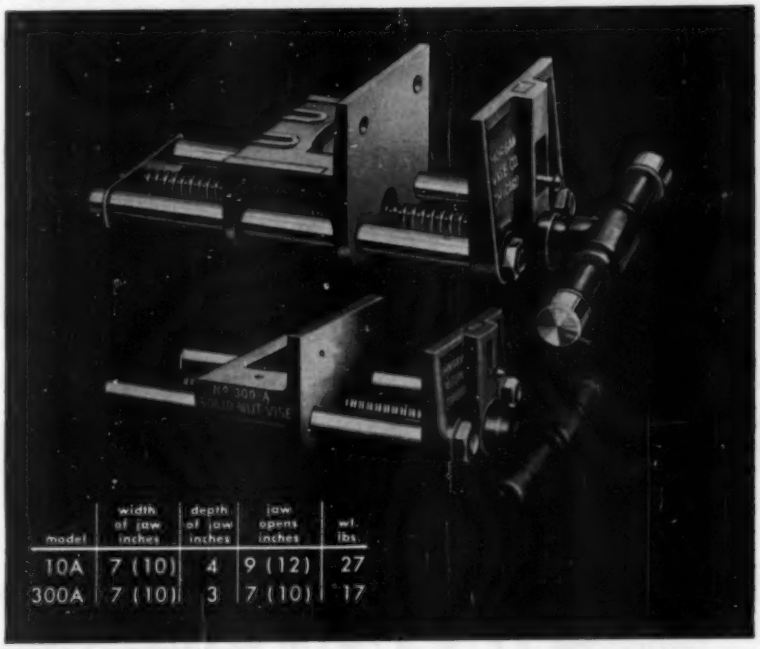
The *quick-drying, rub-on* type of finish is very easy to apply, and it dries very rapidly. This finish is a good school shop choice.

Low oleic vienna-type oil has very good drying qualities and appearance. This finish is not to be compared with linseed oil as this is much superior.

The woodworking instructor, when purchasing a wood finish, should give more thoughtful consideration to the composition of the finish than to the brand name of the product. In that way he would be more successful in his wood-finishing techniques.

— Lester Eggers
Woodworking Instructor,
Dyer, Ind., Central High School

TWINS IN DESIGN....TOPS IN EASE....



model	width of jaw inches	depth of jaw inches	jaw opens inches	wt. lbs.
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300A	7 (10)	3	7 (10)	17

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appointments . . .

▸ *Dr. Joseph V. Yance,* to the Operations Evaluation Group, sponsored by Massachusetts Institute of Technology, as a member of the research staff of the group's Applied Science Division at Cambridge, Mass. The Operations Evaluation Group is the oldest formal U. S. organization engaged in military operations research. It has its principal facilities in the office of the Chief of Naval Operations in Washington, D. C.

Dr. Yance, a resident of Boston, received a B.S. degree in Business and Engineering Administration from M.I.T. in 1948 and a Ph.D. in Economics from Harvard in 1955. He was an assistant professor of industrial management at M.I.T. from 1958 to 1959, and since that time has been an economic consultant for private industry.

▸ *William M. Devonald,* to the position of Practical Arts Director at Newark, N. J. He has been an industrial arts teacher and administrator for many years, at Newark, and is editor for the past fourteen years of *News-Magazine* published by the New Jersey Vocational and Arts Education Association. In his new position he is in charge of industrial arts, home economics, and technical education in the elementary, secondary, and special schools of Newark.

▸ *Dr. John S. Carpenter,* Blacksburg, Va., named State Director of Trade and Industrial Education for Delaware with offices in Dover. Dr. Carpenter was formerly head of Industrial Education at Virginia Polytechnic Institute.

▸ *Edward M. Claude,* as Assistant Director of Vocational Education in Illinois effective August 2, 1960, following fifteen years of service with the Board of Vocational Education as Chief of the Division of Trade and Industrial Education. He will continue in this capacity in addition to his new duties as assistant director.

▸ *Lowell Carver,* supervisor of the undergraduate program in industrial education at Iowa State University since 1938, has taken on the duties also of conducting the graduate program in industrial education, starting July 1, 1960.

▸ *Alfred A. Lease,* instructor of industrial arts at St. Cloud State College, has been appointed Executive Secretary to the Minnesota Industrial Arts Association. His position will make him responsible for inaugurating and conducting a public relations program within the state of Minnesota. Mr. Lease is past president of the association, his term of office having expired in 1957.

▸ *Harold Baxter,* department chairman and former instructor of industrial arts and vocational subjects at Norwich (N.Y.) High School from 1946 to 1960, as an associate education supervisor in the Bureau of Industrial Arts Education, State Education Department, Albany. He will be supervising in the southern and western part of the state with Dr. Robert S. Seckendorf.

▸ *Paul E. Griffith,* as administrative assistant with the Autonotics division of North American Aviation Inc., Downey, Calif. Formerly assistant professor of industrial arts at Fort Hays, Kans., State College.

▸ *Edward W. James,* as graduate assistant in industrial arts for 1960–61 at Northern State Teachers College, Aberdeen, S. Dak. Mr. James just completed four years teaching industrial arts at Haines, Alaska.

▸ *Northern State Teachers College* (Aberdeen, S. Dak.) *Alumni: James Anderson* teaching radio and TV at Rapid City; *Thomas Baxter* teaching at Barnard; *Mason Beer* industrial arts teacher at Pierre; *Edward Buchols* teacher of industrial arts subjects at Sioux City; *Leonard Edwards* teaching at Dupree; *Richard Gebhart,* teaching mechanical drawing classes at Central High School, Aberdeen; *David Haseltine* teaching industrial arts and junior high science at Eureka; *Harold B. Henley* teaching at McLaughlin; *Milo Heonchild* teaching at Hosmer; *Leroy J. Sanders* teaching drafting and elementary crafts at Western Illinois University, Macomb; *Arnold Schock,* as a teacher of vocational subjects at Turtle Mountain, N. Dak.; *Kenneth L. Schmitt* teaching industrial arts at Ipswich.

deaths . .

▸ *Eugene J. Robinson,* formerly supervisor of industrial arts for the Dayton, Ohio, schools, who retired in June, 1959, died suddenly on October 30, 1960. He received his teaching degree from Miami University and taught several areas of industrial arts for twenty-four years, all in the city of Dayton. Since then he had been supervisor of industrial arts until his retirement. During the years, Mr. Robinson had held offices in all state, regional, and local associations of industrial arts interest.

▸ *Arthur P. Twogood,* who served since 1937 as teacher trainer, trade and industrial education, Iowa State University, Ames, and for fifteen years previously had been supervisor of industrial education at Newton, Iowa, High School, died on November 22, 1960. In addition to his long career as a teacher and supervisor, Mr. Twogood was the author of many manuals, bulletins, and articles for professional journals, and also developed and produced numerous vocational guidance films.

Mr. Twogood received his B.A. degree from the University of Iowa, and his M.S., from Iowa State University, where work toward a doctorate was interrupted by duties related to training programs during World War II.

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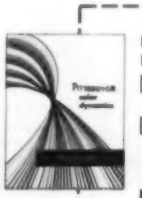

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ASSOCIATIONS

(Continued from page 17)

just that portion usually labeled vocational education.

4. Grave social and economic consequences are likely to result if we fail to make it possible for most young people to enter successfully the world of work.

5. Vocational education programs and attitudes towards vocational education have not kept pace with changes in the world of work, especially in the large cities.

6. The role of counseling and of counselors increases in importance and in difficulty. Counselors need better understanding of the role of all instruction as it relates to the preparation for the world of work.

7. The role of occupational choice and occupational preparation is often essential to motivation to continue in school long enough for the pupil to see the need to raise his occupational goal.

8. The changing role of women in the work force indicates the need for more vocational programs for girls.

Dr. Brownell pointed out that if education is to succeed, the above major points must be given serious consideration. He concluded by indicating that the following big steps must be taken:

1. Vocational education must be considered on a comprehensive basis.

2. The functions of vocational education are more important than the organization plan for which the objectives are obtained.

3. All pupils in a school must be provided programs to prepare for entering the world of work.

4. Vocational education cannot be separated from or be an appendage to the secondary schools.

In a second portion of this Wednesday meeting, Dr. Frank Lindsay, Chief of the Bureau of Secondary Education of the State Department of Education of Sacramento presented a report on the subject, "Let's Quit Running Scared." Dr. Lindsay pointed out that there are many critics of public education who insist that our young people should get more academic subjects. Dr. Lindsay believes that we should be more concerned with the kind of education that will fit young people to live successfully in today's complicated life. His conclusion was that we should develop a comprehensive program that includes both vocational and academic work.

An outstanding feature of the Thursday morning program was a report on the "Shop Classroom of the Future" by Dr. James D. Finn, Professor of the University of Southern California. The title of this program is actually a misnomer for it did not deal with the shop, but with technology in education. Dr. Finn traced the history of teaching machines from the time of the early 30's when there were only a few motion picture projectors in use in public schools to the present day in which a wide variety of teaching machines and audio-visual devices are attempting to automate teaching. He believes that the complete answer to good instruction in our schools lies in a three-fold type of instructional kit. There would be the mass teaching devices such as the movie, the strip film, television, and other similar mechanical devices. There would also be individual instructional devices such as the learning machine. Further, there would be the conventional teaching materials including textbooks, courses of study, tests, workbooks, and so forth. All three of these would constitute the combined instruction kit to help the teacher do a better job.

The officers of the American Technical Education Association, elected at the annual business meeting on December 5, 1960, are:

President — J. William Morosi, dean, Los Angeles Trade-Technical College, Los Angeles, Calif.; vice-president — Walter J. Bartz, chief, technical education, State Department of Education, Springfield, Ill.; treasurer — Richard W. Howes, chief, Bureau of Vocational Services, State Department of Education, Hartford, Conn.; executive secretary — William N. Fenninger, 22 Oakwood Place, Delmar, N. Y.

Trustees: Carl J. Anderwald; Walter J. Bartz; H. Russell Beatty; Burr D. Coe; William N. Fenninger; G. Ross Henninger; Richard W. Howes; Edward H. Lang; J. William Morosi; Joseph T. Nerden; William Pabst; Fred R. Thornton; and Richmond A. Young.

Members of the Regional Advisory Council: Canadian — Frank H. Wetmore; New England — Nicholas J. Hondrogen; Atlantic — Joseph S. Umowski; Southern East — Theodore A. Koschler; Southern West — Warren A. Seeley; Central East — Carl H. Turnquist; Central West — Hollis W. Dahlor; Mountain — Lorenzo. E. Peterson; Pacific — Richard S. Nelson.

In Summary

About 1750 registered at the Biltmore Hotel for the convention. This was a relatively small group and must have been disappointing to those who planned and prepared the program. Many of those attending expressed the opinion that there were not enough classroom teachers or prospective teachers participating. However, this reporter found the convention a most gratifying experience and will look forward with interest to the meeting next year.

— J. L. F.

VIRGINIA INDUSTRIAL ARTS ASSOCIATION

Dr. Ivan Hostetler, president of the American Industrial Arts Association, and head, department of industrial arts education at North Carolina State College, was the key speaker at the third annual convention of the Virginia Industrial Arts Association, held in Richmond in November.

In discussing the topic, "Improving Industrial Arts Education," Dr. Hostetler urged industrial arts teachers to foster programs of instruction that would achieve the following basic objectives: (1) develop in students an insight and understanding of industry and its place in our culture; (2) discover and develop talents of students in the technical and applied sciences; (3) develop the technical problem solving skills related to materials and processes; and (4) develop in students a measure of skill in the use of common tools and machines.

Stressing the importance of technical knowledge in today's world, Dr. Hostetler pointed out that manipulative skills were important only when they contributed to the realization of the major goals of industrial arts. The important aims centered around the development of insights, understandings, technical knowledge, problem solving skills, and discovery of talent.

In addition to the four objectives mentioned, Dr. Hostetler recommended an action program to include the following steps: organize state and local conferences and engage in experimentation; set up pilot programs to test new ideas; engage in soul-searching activities to keep abreast of the times, and be well grounded in sciences and mathematics; study the behavioral sciences; and make changes in teaching methodology.

The officers for the year, elected at the business session of the Virginia Industrial Arts Association at Richmond, in November are: president, Joseph A. Schad; first vice-president, Ralph Lewis; Second vice-president, Frank West; and secretary-treasurer, Virgil Harris.

NORTH CAROLINA INDUSTRIAL ARTS ASSOCIATION

The annual North Carolina Industrial Arts Association fall meeting was held in High Point, at the new Northwest Junior High School, on Saturday, November 12, 1960.

The program centered on the area of shop safety. Dr. Wayne Hughes of the National Safety Council was the guest speaker.

Exhibitors' displays and a luncheon preceded the business meeting, presided over by Carroll Smith, president.

OREGON INDUSTRIAL ARTS ASSOCIATION

The Portland Industrial Education Association was host to the fall conference of the Oregon Industrial Arts Association on November 11 and 12, at Benson Technical High School, Portland.

The theme of the meeting was "New Horizons," dynamically presented in a symposium with the following people assuming leadership: George Cox, Oregon State College; Dr. Athol Baily, University of Washington; Dr. Pat Atteberry, Western Washington College of Education; Dr. William Bakamis, Washington State University; and Ray C. Mertes, educational director, United Air Lines.

The "Ship" in its first official appearance at this conference was led by Al Robinson, Barbo Machinery Company.

Officers of this group are: president, Dee Green; vice-president, David Turnbull; secretary, Marguarette Hallock; and treasurer, John Barnes.

CALIFORNIA INDUSTRIAL EDUCATION ASSOCIATION

The annual convention of the California Industrial Education Association — Southern Section — will be held January 20 and 21, at Cerritos College, Norwalk, Calif. The convention theme is "A Program for Discriminating Educators."

The agenda for Friday — Industrial exhibits, school exhibits, and shop visitation at Cerritos College, from 3 to 7

(Concluded on page 52)

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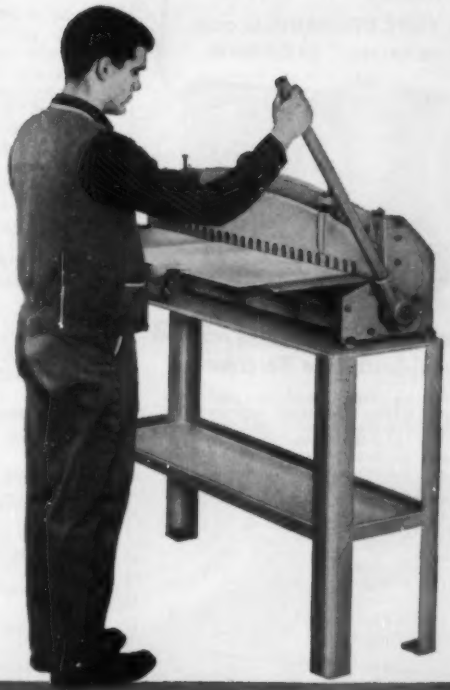

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ASSOCIATIONS

(Concluded from page 50)

o'clock. From 7 to 9 o'clock, a program geared to "Bring Your Administrator" with half-hour presentations on the following topics: "Reporting to the Board," William Steinberg; "Industrial and Language Arts," Gordon Funk, "Objective Evaluation," Milo Johnson; "Reporting to Parents," Fred Baer.

Saturday's program includes a general session with theme speaker from 9 to 11 o'clock, followed by luncheon, demonstrations, and the "Ship's Drawing" and presentation of awards.

Ted Elmgren, El Camino College, is president, and Ralph Bishel, industrial arts consultant, Montebello, is secretary-treasurer.

The Oakland-San Francisco Bay Section of the California Industrial Education Association will conduct its 6th Annual Industrial Education Institute at the DeAnza High School, Richmond, on Saturday, January 21, 1961, from 9:00 a.m. to 1:30 p.m.

Mr. Orley Imes is the institute chairman.

MINNESOTA INDUSTRIAL ARTS ASSOCIATION

The new slate of officers for the Minnesota Industrial Arts Association for the 1960–61 and 1961–62 school years is: president, Gerald L. Steele, Orono Public School, Long Lake; vice-president, L. Grandprey, Public Schools, Windom; secretary, Horace M. Mayo, Southwest High School, Minneapolis; treasurer, James D. Nygaard, Onamia Public Schools; executive secretary and public relations director, Alfred Lease, St. Cloud State College.

FAIRFIELD COUNTY PROGRAM

The Fairfield County (Conn.) Industrial Arts Association announces its new officers for the 1960–61 school year. They are: president, John Burkhardt, Stamford High School; vice-president, Donald MacCormack, Johnson Jr. High School, Stratford; secretary, Werner Friess, Staples High School, Westport; and treasurer, Joseph Bonitatibus, Harding High School, Bridgeport; state vice-president, Bartlett Lund, Ridgefield High School; state representative, Robert Joyce, Joel Barlow Reg. High School, Reading; and membership chairman, Donald Tracey, High School, Norwalk.

COMING CONVENTIONS

Feb. 24–25. Texas Industrial Arts Association, at Texas A. & M. College, College Station, Tex. Secretary-treasurer, Frank Miller, Travis Jr. High School, Snyder, Tex.

Mar. 2–4. Illinois Vocational Association, at Chase-Park Plaza Hotel, St. Louis, Mo. Secretary, C. E. Summerville, 103 North Lynn St., Champaign, Ill.

Mar. 9–11. New Jersey Vocational and Arts Association, at Berkeley-Carteret Hotel and Convention Hall, Asbury Park, N. J. Secretary, Richard O. Harthmann, 236 Lexington Ave., Jersey City, N. J.

Mar. 17–18. California Industrial Education Association, at Fairgrounds, Fresno, Calif. General chairman, Robert P. Hansler, director of industrial education, Fresno City Schools, Fresno, Calif.

Mar. 23–25. Ohio Industrial Arts Association, at Neil House, Columbus, Ohio. Secretary, Robert Boyer, 7463 Midland Rd., Cleveland 31, Ohio.

Apr. 5–7. American Industrial Arts Association, at St. Louis, Mo. Program chairman, Robert Swanson, Stout State College, Menomonie, Wis.

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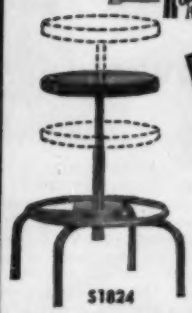

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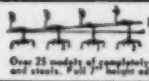

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research

IS THE PROJECT METHOD THE MOST EFFECTIVE METHOD OF TEACHING APPLIED ELECTRICITY?

Electricity involves manipulative skills in several industrial arts areas. It also involves a much greater percentage of informational content than most other industrial arts courses. Since this is the case, are we certain that the typical industrial arts project method of teaching is the most effective way to teach the content desired in applied electricity?

Johnston* attempted to answer this question by conducting an experimental study to compare the *teacher-demonstration method* of illustrating the principles and applications of electricity and the conventional industrial arts *shop activities method* utilizing project construction to teach electrical principles and applications. The experiment was conducted with college electricity classes at Kansas State Teachers College, Pittsburg, Kansas, and covered a period of two years.

The teacher-demonstration method involved an instructional procedure in which the instructor, himself, or with the aid of the students, performed group demonstrations, illustrating the principles or applications of electricity involved in the course.

The shop activity method involved individual student participation in the construction of simple electrical projects, the installation of electrical circuits and equipment, and the repair of electrical devices in which were contained the principles or applications to be taught.

Johnston taught a series of classes utilizing each approach and then compared them in an attempt to ascertain if one approach was more effective.

The Findings

Upon comparing the groups at the conclusion of the experiment, it was found that the groups observing teacher-demonstration were significantly superior in informational achievement. Treated statistically, this difference was significant at the one per cent level of confidence.

The teacher-demonstration groups were also found to involve less expense both to the students and to the school, and, therefore, were considered superior in this factor. The shop activity method cost the students eleven times as much as the teacher-demonstration method.

The shop activity method required more effort on the part of the instructor. This involved the preparation of written instructional materials and the procurement, handling, storage, preparation for use, and issuing of materials and supplies.

The teacher-demonstration method did require more effort in the grading of their laboratory notebooks than the grading of the projects of the shop activities group. However, the shop activities group also involved effort toward such activities as maintenance, checking bills of material, issuing charge slips, and preparing inventories. In terms of effort required on the part of the instructor, the teacher-demonstration method was found to be superior to the shop activity method.

An examination of the attitude of students in the two groups revealed that the two methods were equally effective.

Some Considerations

The preceding reported study indicated that the basic principles and applications of electricity were more effectively

*John Leslie Johnston, "Teacher Demonstrations Versus Shop Activities in the Teaching of Electricity: An Experimental Comparison" (Unpublished doctor's dissertation, University of Missouri, Columbia, 1956.) Available: University Microfilms, Ann Arbor, Mich.

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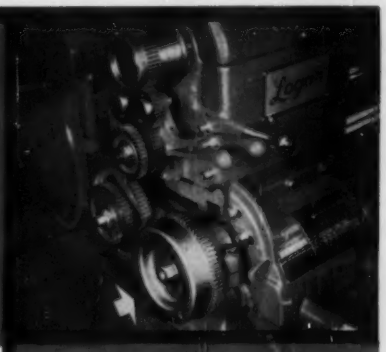

All Logan 11", 12" and 14" lathes as well as models 1825 and 1875 *(shown)* 10" lathes, now offer positive overload protection without additional cost. Exclusive Automatic Safety Gear absorbs shock of sudden overloads when threading, preventing gear damage from spindle to gear box. Also protects all gears in gear box up to 52 threads per inch. The combination of this Safety Gear and spring-loaded lever-operated clutch in apron gives the same protection for corresponding feeds. Can be factory-installed on other models of new 10" and 9" quick-change lathes. Available for present Logan quick-change lathes: $10 for 9", 10" and 11" sizes, $15 for 12" and 14".

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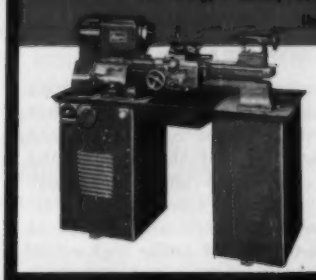

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"Your 'Working with Light' packet offers much more in the area of science of lighting than the ordinary project book used in shops. I'm happy to see more of this 'why' and 'how' scientific approach."

This comment from a shop teacher is typical of the high praise accorded the supplementary classroom program distributed by the Better Light Better Sight Bureau. Last year, 30,000 teachers sent for this comprehensive program. It presents the intriguing subject of Light and Sight in a manner designed to heighten student interest and lighten teaching work. Moreover, the Bureau's aids are thoroughly up-to-date, in contrast to standard textbooks which are not normally able to keep abreast of rapid developments in this specialized field.

NEW KITS READY NOW

The Bureau's supplementary teaching program, "Working with Light", has been prepared after consultation with representatives of the N.E.A., the A.I.A.A., the A.V.A. and others prominent in industrial arts and vocational education. It is specifically formulated for high school and junior high school industrial arts classes, and includes a 116-page lighting handbook, 24 project leaflets and a reference folder for each of 24 students.

FREE FOR THE ASKING

A complete package of "Working with Light" materials will be sent *without cost or obligation* to shop teachers in areas served by a Better Light Better Sight Bureau utility sponsor. (We will check our sponsor list for your area.) For your free kit, use the readers' service card in this magazine... or simply send your own name, and your school's name and address, to: BETTER LIGHT BETTER SIGHT BUREAU, Dept. WWL-49, P.O. Box 1647, Grand Central Station, New York 17, N.Y. *(Offer not available to students nor to subscribers outside the U.S.A.)*

taught at less expense, and involved less instructor effort using the teacher-demonstration method than the traditional industrial arts project method. This occurred with no difference in the attitude of the students toward the class.

This does not imply that we should abandon the project entirely, empty our shop of tools, and become a lecture-demonstration laboratory! Basically, industrial arts is an activity program. We can view these results, however, as an indication that we could well examine how we now teach our basic electricity. Since teacher-demonstrations are quite effective, perhaps we should make increased use of them. Many things can be taught more effectively and economically through a demonstration. Does a boy have to make a toy motor to learn why a motor runs or the theory involved? Many of our electrical classes are really metal and woodworking classes. Perhaps a boy can learn the principles behind an electric motor in a single class. What do we instructors frequently do? We require a lot of time to be spent, weeks sometimes, constructing a motor. This is teaching metal fabrication. Is this the purpose or an objective of your electricity course? Perhaps in a comprehensive general shop, if you wish to include metal and electrical experiences, this is justified.

Electrical projects make good general shop projects. We should carefully observe our objectives. What is the purpose for doing this? Is it what we really want to teach?

Student experiments can be highly valuable and successful. As much as some instructors look with disfavor on kits, they have, in light of the above study, real value. They enable principles and applications to be taught in a minimum of time with a minimum of fabrication.

In summary, we should recognize that while there are a number of manipulative skills unique to the electrical industry, the mastery of applied electricity requires, first and foremost, an understanding of basic principles and their applications. The sooner we in industrial arts recognize and accept this fact, the quicker we will advance beyond the mere construction of toy motors and the installation of doorbell circuits.

— **William Spence**
Associate Professor of Industrial Education
Western Michigan University, Kalamazoo

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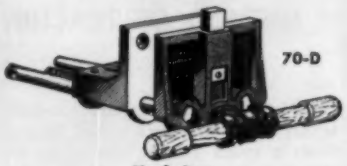

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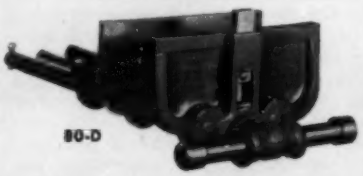

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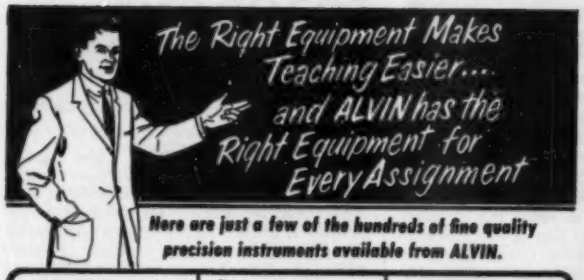

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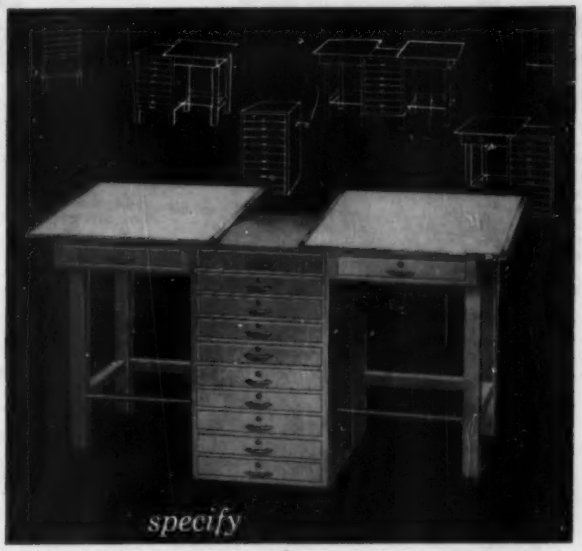

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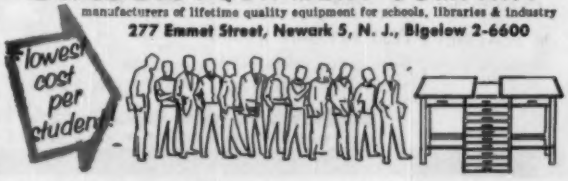

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film on automation The "Automatic Career" story is a 20-minute, 16mm., sound-and-color film — for showing in high school machine shops — on automatic screw machines. Shows how precision automatics operate and what they produce; it illustrates the applications of instruction to industry with a vocational guidance overview of what school training will do in screw machines careers. Available postage only from the National Screw Machine Products Association, 2860 E. 130th St., Cleveland 20, Ohio.

vocational programs Newly revised issue of "Public Vocational Education Programs" is designed to give an overview of the co-operative Federal-State program of vocational education developed under the Smith-Hughes Act of 1917 and the George-Barden Act of 1946. Basic data on aims, essentials, administration, financing, characteristics, etc.

on careers A 32-page booklet with basic information about 113 careers: nature of work, employment trends, personal qualifications, preparation, entrance and advancement, advantages, disadvantages, earnings, number and distribution, sources of further information. For guidance personnel, teachers, students, etc., "You . . . and Your Career" thoroughly analyzes vocational opportunities. Data on career guidance careers in science; select list of reference books. 50 cents, Collier's Encyclopedia, Library and Educational Division, 640 Fifth Ave., New York 19, N. Y.

patternmaker's manual The American Foundrymen's Society has published the 1960 "Patternmaker's Manual." The 406 pages carry all the tables, charts, diagrams, and formulas essential to daily use by trained patternmakers or to the training of patternmakers for the foundry field. Eight new chapters have been added, containing up-to-the-minute information on matter covered in other chapters, plus new reference charts, tables, and formulas. Write the AFS, Golf and Wolf Roads, Des Plaines, Ill. Copies cost $6.50 for AFS members and $9.50 for nonmembers.

vo-ag aids teaching Successful Farming magazine offers a unique vocational agriculture teaching aids program. The magazine brings to the student farm news that is completely up-to-date on the scientific and technological changes in machinery and chemicals. No highly technical language. The student can easily understand the material presented, which deals with specific cases rather than generalized material, and is augmented with many illustrations. The SF program also includes in the magazine a monthly teacher's kit, with detailed teaching guides to accompany three of the articles in that month's issue, plus a large 28 by 39 inch wall chart, adapted from one of the month's top features. For details write New Bureau, Meredith Publishing Co., De Moines 3, Iowa.

new books

How to Instruct Successfully

By Thomas F. Staton. Cloth, 292 pp., 5½ by 8¼ in., $4.50. McGraw-Hill Book Co., Inc., New York, N. Y.

The author intended this book primarily for those who will be teaching adults but who have not had the benefit of extensive training in education or a great deal of practice in instructing. The basic principles of educational psychology are covered briefly before going into practical methods of teaching procedures.

The book's sixteen chapters cover material on the nature of learning, psychological factors underlying learning, applying the principles of learning, planning for instruction, the lecture method, the demonstration-performance method, the group discussion method, the role-playing method, a system for conducting instruction, instructional aids, preparing a classroom, measuring achievement and performance, principles of employee counseling, employee counseling as a training device, broadening your qualifications as an instructor, and designing and administering a training program. There is an index.

Organization and Effective Use of Advisory Committees

By Sam W. King. Paper, 75 pp., 5¾ by 9 in., U. S. Department of Health, Education, and Welfare, Office of Education, Washington 25, D. C., 30 cents.

The purpose of this bulletin is to develop a better understanding and appreciation of the role of the formally constituted advisory committee, in relation to the trade and industrial education program, and the publication is designed to serve as a guide for local administrators and teachers of trade and industrial education programs, and should be of assistance to all who work with advisory groups.

Teacher Competencies in Trade and Industrial Education

By John P. Walsh. Bulletin may be obtained from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C., 30 cents.

An Office of Education study in response to a questionnaire directed to 514 successful teachers of trade and industrial subjects, 228 State and local supervisors, and 120 trade and industrial teacher educators in all the States and Territories, pointing up the fact that teachers of these subjects need many distinctive skills and abilities in addition to those required by regular classroom teachers. The reactions of local administrators, State and local supervisors, and teacher educators are summarized for the help of those in the field of teacher preparation and curriculum planning.

Modern Machine Woodworking

By William F. Holtrop. Cloth, 280 pp., 6¾ by 10 in., illus., $4.50. The Bruce Publishing Company, Milwaukee 1, Wis.

A complete, illustrated presentation of the various woodworking machines and the operations that can be performed with them. It will familiarize the student in technical, trade, and vocational schools with the tools he is using and give him some knowledge of the machines being used for industrial production. Included are chapters on circular saws, band and jig saws, planing and scraping machines, wood-turning lathes, sanding machines; mortisers, borers, and tenoners; shapers and routers; glue room machinery and clamping equipment. The installation and maintenance of these machines is covered in a separate chapter.

Following each chapter are a series of review questions and problems designed to aid the student in his study.

The first edition was prepared by Herman Hjorth whose books on woodworking have been recognized as standards for the past 30 years.

Sheet Metal Pattern Drafting and Shop Problems

By James S. Daugherty and Robert E. Powell. Paper, 185 pp., 9⅝ by 7¾ in., illus., $2.76. Chas. A. Bennett Co., Inc., Peoria, Ill.

Originally prepared as a text for use in vocational schools, trade schools, technical schools, and high schools offering courses in sheet-metal pattern drafting and shop work, and for home study by apprentices and sheet-metal workers, the material has now been revised to make the work more complete, with additional problems where it was felt they were needed. The subject-matter and method of presentation are the outcome of many years of teaching and practical experience in the various branches of the sheet-metal industry. In the revision of the material the changes have been made with the idea in mind to further assist the vocational or trade school student, apprentices and sheet-metal workers, draftsmen and shop foremen to become more proficient in their work with the help of this book.

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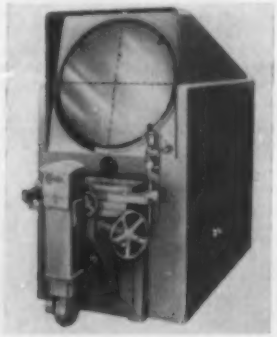
optical comparator From Covel Manufacturing Company, their No. 30 Optical Comparator with specifications for stage: vertical travel 8 in., horizontal travel 8 in., size of table 8 by 24 in., centerline of lens above work table maximum 8 in., minimum 0 in. Lenses — turret mounted

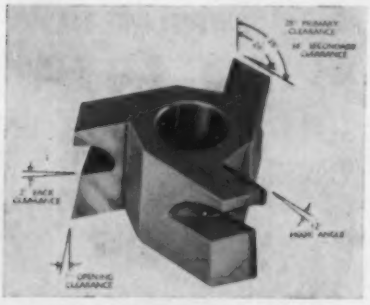


Covel No. 30
Optical Comparator

inside cabinet with control outside, number of stations in turret 5, standard lenses 10X, 20X, 31¼X, 50X, and 62½X. Over-all dimensions: width 40 in., length 94 in., height 72 in., net weight 3170 lb., shipping weight 3860 lb. Projection lamp 500 watt, 110 volt, single phase, 60 cycles. The stage uses micrometers of one inch travel for measuring both the horizontal and vertical planes with provision for measuring rods or gauge blocks for the balance of the stage travel. The optical system uses relay lenses so the projection lenses are inside the cabinet, therefore do not project out over the table allowing maximum staging room. Optics are arranged for an upright image for all magnifications. Screen ring is graduated and has a two minute vernier. Stage table has built-in angular adjustment 15 deg., each way with vernier.

(For further details encircle index code 0201)

cutter with tungsten carbide tips From Delta Power Tool Division, Rockwell Manufacturing Company, designed for long wear in cutting today's plywoods containing phenolic resin-type binding agents that ordinarily quickly dull high-speed steel cutters, will cut accurately and smoothly for longer periods. It is available in two models, one for clockwise rotation with feed from left to right with rabbet down, and the other for counterclockwise rotation with feed from right to left with rabbet down. It has a diameter of 2 9/16 in., and a bore of ¾ in., which may be reduced to ½ in., with bushings that are furnished with each cutter.



Delta's Door-Lip Shaper Cutter

(For further details encircle index code 0202)

drill press From Clausing Division, Atlas Press Company, their heavy-duty general purpose drill presses that incorporate many excellent features for greater accuracy, capacity, and efficiency. Available with choice of positive power variable speed drive that makes possible any speed from 500 to 4500 r.p.m., while drill is running — or 5-speed drive with spindle speeds from 410 to 5380 r.p.m. Heavier throughout, with 3-in. diameter columns for maximum rigidity and accuracy, they feature 10 by 14-in. precision ground tilting table; massive base with 10 by 13-in. ground working surface; positive depth stop; front mounted safety switch, furnished with all models; splined drive spindle supported by two lubricated-for-life ball bearings; precision-ground spindle floated free from quill by two oversized lubricated-for-life ball bearings; machined and balanced pulleys; models equipped with motors are

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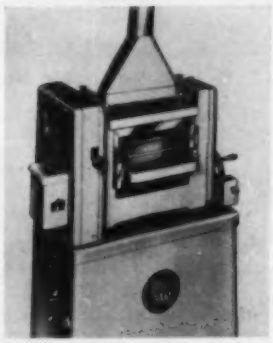
(For further details encircle index code 0203)

Planer From Boice-Crane Company, their latest model 12 by 14-in. Planer can be equipped with efficient shavings collection system. A steel collector hood provides a 4-in. diameter connection for either an



Planer with
Dust Collection System

individual collector unit, or the piping of the shopwide system. Other features in the planer include an improved chipbreaker, improved cutterhead guarding, and automatic feed pick-up as stock starts through. A descriptive brochure is available upon request.
(For further details encircle index code 0204)

17-in. drill press line From Walker-Turner Division, Rockwell Manufacturing Company, this new line features a new internal depth stop which permits stopping of the pinion at any pre-set depth within the full 5-in. spindle travel range. A depth gauge, calibrated down to 1/16 in.,

17-in. Drill Press

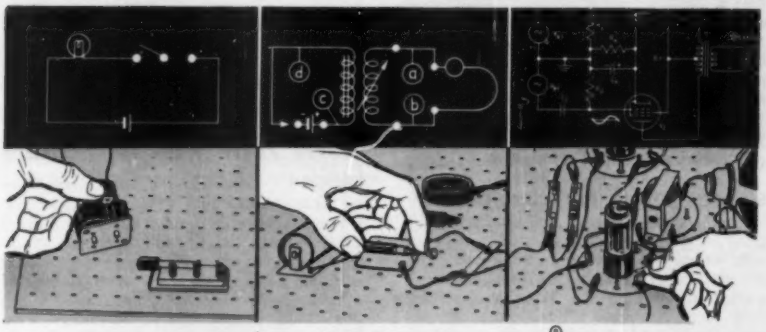
and magnified 2:1 for easy reading, is attached. In addition, Walker-Turner is offering 84 model variations to suit a wide range of job requirements. Included are single spindle floor and bench models, multiple-spindle units and drill heads with either hand or power feed. These new features provide numerous other conveniences. Please write for complete details of the new drill presses.
(For further details encircle index code 0205)

master analyzer From Snap-On Tools Corporation, the New MT-4050 Master Analyzer Engine Testing Laboratory, combining five precision testing components in cast aluminum and sheet steel console. Units included in this outfit are MT-615A Anal-O-Scope, MT-430 Ignition

MT-4050 Master Analyzer
Engine Testing Laboratory

Analyzer, MT-401B Generator Regulator Tester, MT-415B Tach-Dwell Meter, and MT-425 Vacuum and Fuel Pump Pressure Gauge. This combination of engine testing equipment is designed to provide faster, more efficient and more accurate work, resulting in greater customer satisfaction. For complete information on the basic features of the individual components, write to the manufacturer. Booths 331 and 332 at the International Automotive Service Industries Show, February, 1961, in Los Angeles, Calif., will feature these products.
(For further details encircle index code 0206)

reciprocating super saw From Millers Falls Company, their new electric tool, ideal for millrights, electricians, plumbers, carpenters, or for installation men and others confronted with difficult cutting and



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SHOP EQUIPMENT NEWS

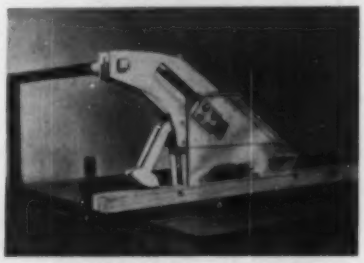
(Continued from previous page)

Millers Falls Reciprocating Super Saw

sawing problems. Outstanding features are an assortment of 15 interchangeable blades; a reciprocating mechanism that prevents vibration; a flush cut attachment to facilitate difficult cuts; rugged, lightweight aluminum housing; a ½ horsepower motor; a locking trigger switch; ball-bearing construction; and an easy-grip tapered nosepiece to make sawing in small areas easy. The No. 550 Super Saw Kit is complete with saw, steel carrying case, 12 assorted blades, tube of lubricant and blade wrench. Additional information furnished upon request.

(For further details encircle index code 0207)

safety guard for circular saw From General Scientific Equipment Company, a gliding-action guard which lets the user of any table model circular saw see all work operations clearly through transparent plastic shields. The Safety Glide Saw serves to protect during cut off, ripping, dado, and grooving work to various widths and thicknesses. Equipped with large and strong dual "anti-kick backs," operate separately or together. Mounted on table, floor, or ceiling, installation is fast and simple, for either tilting table or it also features an adjustable splitter which adjusts to clear work when not in use.



Safety Guard for Circular Saw

Breakproof shields of ¼-in. clear plexiglas tilting arbor. Sealed ball bearings require no oiling. Descriptive literature and prices sent upon request.

(For further details encircle index code 0208)

utility knife with retractable blades From Stanley Tools, their newest utility knife with a safety button that projects and retracts razor-keen blade from the handle to two cutting positions — fully extended and one-quarter extended. Latter position keeps blade at correct depth for opening cartons or for similar applications where knife depth should be limited. Finished in gun metal hammered tone, No. 99 utility knife comes equipped with con-

Utility Knife with Retractable Blades

toured 6½-in., handle and four heavy-duty (No. 1992) blades. Utility knife No. 299A is designed to be used as a regular knife or as a scraper, with contoured storage-type 5½-in. handle, also finished in gun metal hammered tone, equipped with regular duty (No. 1991) blades and blade guard. Further information available.

(For further details encircle index code 0209)

sheet-metal workers' vise From The Columbian Vise & Mfg. Company, their improved vise — Model No. 224½ — with replaceable steel jaw faces and malleable iron unbreakable castings, considered ideal for industrial sheet-metal work, auto body and aircraft work, and woodworking. Equipped with a swivel base which permits it to be swung freely and locked in any desired position, a steel clamping nut operates a forged steel bolt with teeth that mesh into gearlike corrugations in the base plate to form a positive lock. Position of work can be shifted and it can be held at

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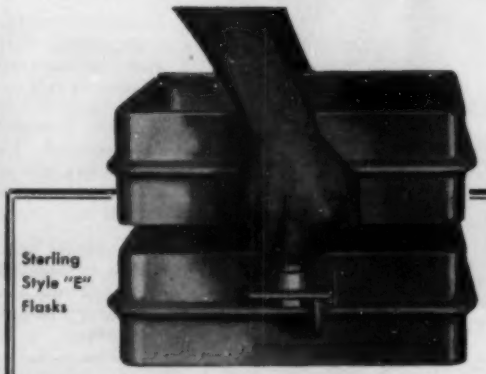

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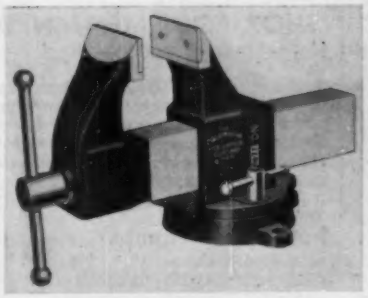

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different angles without removal from vise. Features include a 4½-in. jaw width and 9-in. jaw opening, throat depth 5⅞ in., weight 60 lb. For complete data write and ask for Catalog 60.

(For further details encircle index code 0210)

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(For further details encircle index code 0211)

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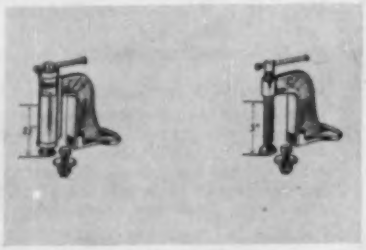
SHOP EQUIPMENT NEWS

(Continued from previous page)

light and foolproof, and cuts along straight or curved lines. Constructed of durable plastic molded into one piece, this cutting implement is equipped with an exchangeable standard razor blade which has a safety proof locking device.

(For further details encircle index code 0212)

hold-down clamps From Adjustable Clamp Company, "Jorgensen" hold-down clamps with patented screw shield and new sliding vise-type handle, equipped for welding service. The heavy steel shield is a protective barrier against damage to the screw threads from "spatter," hammer-blows, or contact with the welding torch.

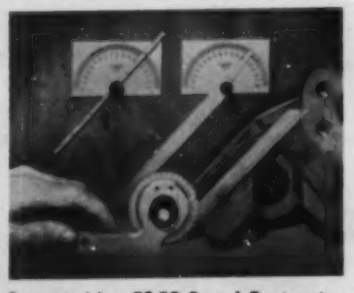


"Jorgensen" Hold-Down Clamps with Steel Welders Shield (left) and Without Shield (right)

Solid steel screw and handle, the reinforced, ribbed frame and shield of special metal are not weakened by repeated heating and cooling. The hold-down clamps make it possible to apply holding pressure in the middle and along the side, as well as near the edge of a table. The holding-bolt may be installed in any surface, drill press or "T-slot" table. When mounted, the clamp swivels 360 deg., around the holding-bolt to hold work at the most convenient spot or angle. When used along the side of a bench, a cotter pin inserted across the slot opening prevents the clamp from falling. Please write for additional information.

(For further details encircle index code 0213)

protractors feature satin-chrome finish From The L. S. Starrett Company, new universal bevel protractors, steel protractors, and protractor-depth gauges featuring no-glare satin-chrome finish for easier reading and high resistance to corrosion and wear. No. C359, available with



Starrett No. C359 Bevel Protractor

7, 12, or 7 and 12-in. blades, with vernier, ultra-fine adjustment and acute angle attachment, measures angles as close as 5 minutes or 1/12 degree. No. C364 is similar to No. C359 but without fine adjustment. New Tools Bulletin No. 143 is available on request, and gives complete information.

(For further details encircle index code 0214)

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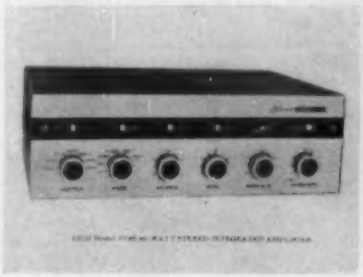


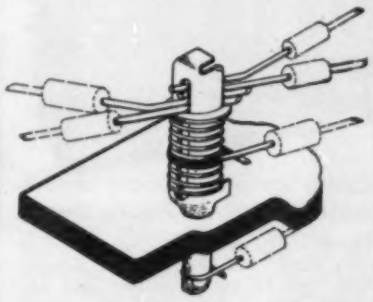
Stereo Integrated Amplifier

magnetic input adaptor), tape head, or preamplified tape. The controls include selector switch, tape monitor switch, separate level and balance controls, balance check switch, scratch and rumble filters, loudness/level switch and full individual feedback-type bass and treble tone controls for each channel. Additional pertinent detailed information available upon request.

(For further details encircle index code 0215)

solderless terminal

From Vector Electronic Company, a new terminal especially for experimental circuitry. Designated as T-30 Solderless Springclip, the terminal holds up to six leads without



T-30 Solderless Springclip

soldering and may be used over and over. No staking is required, and Springclips fit any round 0.093-in. hole. Contact resistance between leads and the terminal is less than 0.003 ohms due to silver plating on the terminal and the unusual spring-clip holding action. Available from stock, in sacks of 10 and 100, or in bulk.

(For further details encircle index code 0216)

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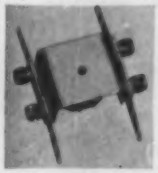

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SHOP EQUIPMENT NEWS

(Continued from previous page)

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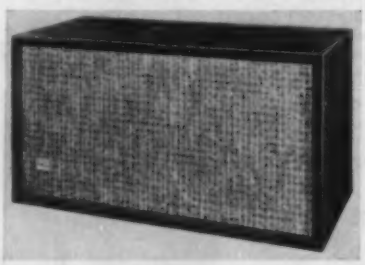
(For further details encircle index code 0217)

speaker system kit From Allied Radio Corporation, the Knight KN-3000A-K Speaker System, in easily assembled kit form, featuring the same components as used in the KN-3000A factory-assembled unit, it consists of a 12-in. high-compliance woofer, two patented



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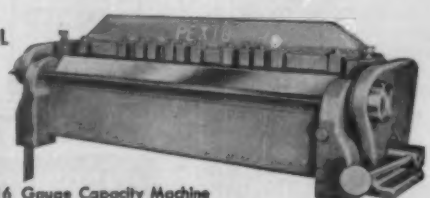

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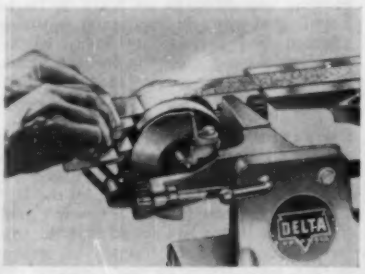
(For further details encircle index code 0218)

u-stain glass kits From Immerman & Sons, and manufactured by Stain Glass Products, the simple craft kit for glass staining requiring no special tools, equipment, or skills. Adaptable to all ages, only 2 steps are required in the U-Stain process: (1) pressing self-adhesive lead strips onto textured glass positioned over a paper pattern; and (2) staining glass with colors as indicated on the pattern. Suggested uses for U-Stain glass panels are: wall hung panels, room dividers, free-standing panels on shelves, and other flat surfaces and mobiles. The introductory U-Stain glass kits contain twelve contemporary designs created by well known artists, and all necessary stains, lead, brushes, instructions, and special textured glass — everything needed to complete a panel 8 by 16 in. Also available are bulk U-Stain supplies for classroom projects.

Craft Kit for Glass Staining

(For further details encircle index code 0219)

plane blade grinding attachment From Delta Power Tool Division, Rockwell Manufacturing Company, this attachment for the Delta Belt and Disk Finishing Machine. It permits precision sharpening of plane blades, wood chisels, cold chisels, screw drivers, knives, and other cutting tools on the belt of this machine. Tool sharpening on a belt is a fast and easy method. A 2-in. wide aluminum oxide belt, used instead of the standard 4-in. belts for sanding and grinding, is supplied with the attachment. The Delta Belt and Disk Finishing Machine provides a 12-in. disk and a 4-in. belt powered by a single motor for use in finishing operations of all types. Also handles all finishing operations on wood, metals, and plastics.



Delta's Plane Blade Grinding Attachment

(For further details encircle index code 0220)

aerosol spray for burns From General Scientific Equipment Company, this new addition to safety kits for industry and business, the fast-acting, effective aerosol spray for burns called G-63. Packaged for industry in 8-oz. spray-on cans, G-63 coats the skin with a protective and invisible film that not only isolates the burn but greatly speeds the healing process and provides immediately effective relief from pain. It reduces swelling, and guards against secondary infection through the use of Hexachlorophene. It eliminates the need for bandages, as well.

(For further details encircle index code 0221)

Descriptive Material...

From Sellstrom Manufacturing Company, a 16-page illustrated safety catalog featuring a total of 57 eye and face protection products and accessories such as their wide variety of plastic-frame safety glasses, metal-frame glasses, cover goggles and clip-ons, plant visitor glasses, fiber glass face shields, and sweat bands, with further information on lenses, replacement parts, goggle cases, and the like. Ask for Catalog No. S-37.

(For further details encircle index code 0222)

From Craftools, Inc., their new Craftool 12-page catalog containing an extensive list of tools, equipment, and supplies for the creative craft of bookbinding. Described and illustrated are bookbinding presses, bookbinding outfits, special tools, guillotine cutters, decorative hand stamps, and handmade papers, as well as a full range of books, pamphlets, and charts depicting the various processes connected with bookbinding.

(For further details encircle index code 0223)

From V. & E. Manufacturing Company, an illustrated four-page bulletin, describing their Model 3300 Drafting Machine,

The second most important tool . . . for every woodworking shop

A VERSATILE
W&H
MOLDER-PLANER
is second only to a saw . . . it molds, planes and rabbets.

OVER 1000 PATTERNS AVAILABLE
FROM PINE PANELING TO FULL ROUND

12 new patented features. Safety Anti-kickback and guard make this one of the safest power tools available — Automatic Hold-Down. A low cost 3-in-1 tool: Planes up to 14" wide boards (7" each pass, reversing). Molds stock ⅛" to 8¼" in depth to a satin finish. Rabbets easily made. Set-up change-over made in minutes — makes the unit extraordinarily versatile. Models from $89.95 to $209.00 f.o.b., Milford, New Hampshire. A portable power tool that pays for itself on the first few jobs. "Your savings pile up as your shavings pile up". From $27.50 down & $6.00/mo.

41 Patterns of standard molding cutters available from stock.

For full details write:
WILLIAMS & HUSSEY MACHINE CORP.
CLINTON ST., MILFORD, NEW HAMPSHIRE

CAN-PRO APRONS AND SHOP COATS
Coast-to-Coast Choice—for comfort, quality, low cost!

Instructors' coats designed for your comfort, long wear. 2 expertly tailored styles, 5 colors.

Here's low-cost protection for students' clothes... Shop aprons in a choice of colors.

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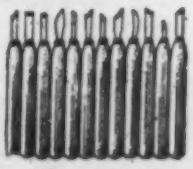

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PHILADELPHIA 23, PA.
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DESCRIPTIVE MATERIAL

(Continued from previous page)

with special emphasis on the 20-in. arm model which covers a drawing area up to 34 by 44 in. Specifications for this as well as the 16-in., and 18-in., arm models are included, together with a section on scales available for these machines. Bulletin available upon request.

(For further details encircle index code 0224)

From Rockwell Manufacturing Company's Delta Power Tool Division, their revised 92-page catalog, describing their complete line of industrial power tools and accessories, including Delta's line of drill presses, grinders, shapers, planers, jointers, metal and wood cutting lathes, tilting arbor saws, unisaws, band saws, and radial saws. Includes complete specifications and descriptions of accessories for all tools. Action photos and drawings supplement the text.

(For further details encircle index code 0225)

From Allied Radio Corporation, their newest Stereo Record and Tape Catalog No. 104, including detailed, informative listings of over 1000 of the latest stereo records and 400 two- and four-track stereo tapes. Organized into three sections — records, 2-track tapes, and 4-track tapes — and subdivided into categories of music, the catalog lists classical records and tapes alphabetically by composer. Listed are popular, jazz, and other types of music by performing artist, groups, orchestra, or title. Free on request, ask for Stock No. 26 R 999.

(For further details encircle index code 0226)

from the field . . .

The Borden Chemical Company, a division of The Borden Company, announces the appointment of Richard Foster as a sales representative for the Consumer Products Department in Georgia, Florida, and Alabama.

The Black and Decker Manufacturing Company announce the opening of its 50th Factory Service Branch in the United States, and the third in Metropolitan Chicago, at 10708 South Western Avenue, Beverly Hills, Chicago 43, Ill., on November 1. The new Beverly Hills Branch makes "factory" service convenient to a growing concentration of Black & Decker electric-tool users in south and southwest Chicago and surrounding industrial and commercial communities in Indiana. Eugene E. Huff is acting service manager of the new branch.

Cerro de Pasco Corporation, New York City, have been cleared of charges against their Lewis-Mathes Division vs. the National Labor Relations Board, by the U. S. Court of Appeals for the Seventh Circuit. The Labor Board had found that the company had refused to bargain in insisting during negotiations on the absolute right to assign work. It also ordered the company to rehire union members who were replaced when they engaged in a strike to force the company to the union demands. The U. S. Court of Appeals found that the evidence in the record did not support the NLRB's findings and order. It found that the company had bargained in good faith, that the strike was an economic strike and that the strikers were not entitled to reinstatement. It denied enforcement of the NLBR's order.

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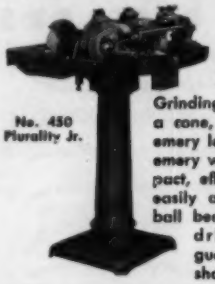

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THREAD
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